1986 FIELD INVESTIGATION AND SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

VOLUME I

FRENCH LIMITED SITE
CROSBY, TEXAS

PREPARED FOR

FRENCH LIMITED TASK GROUP

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1986 FIELD INVESTIGATION REPORT
FRENCH LIMITED SITE

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EXECUTIVE SUMMARY

Several field investigations have been conducted at the French Limited Site since December, 1982. The most recent consolidation of the various investigation reports was published as the draft CERCLA Remedial Investigation (RI) report in June, 1986. This draft was subsequently accepted by EPA, as the final RI Report for the site pending resolution of certain issues to be addressed in the 1986 Field Investigation. Generally, there have been common interpretations of the factual data base. However, in certain areas, limited and/or conflicting data have been reported by the different studies. A 1986 Field Investigation was proposed by the French Limited Task Group and approved by EPA, to broaden the technical data base and investigate four specific areas. A description of these four areas of expanded investigation, and the results of the 1986 Investigation, is as follows:

1) PCB Concentration Distribution in Sludge - This task was designed to identify maximum PCB concentrations in the lagoon sludges. It was also designed to assess the possibility of segregating sludges containing different PCB concentration levels, if there should be a requirement for different disposal methods for different concentration levels.

Only 1 sample location in the lagoon reported a PCB concentration over 500 ppm. This location near the southern shore of the lagoon, reported a 693 ppm PCB concentration. A subsequent re-extraction and re-analysis of the same sample reported 144 PCB concentration. This variability of analytic results precludes a firm conclusion that the sample exceeds 500 ppm PCB concentration.

It is clearly feasible to remove this "spot" of sludge separately from the remaining lagoon sludge, should separate disposal methods be required.

2. Contaminated Soil Volume Assessment - This task provided additional soil contamination analysis data to update the contaminated soil volume estimate. Estimates of contaminated soil volume were made based on four different decontamination cleanup objectives. The results are as follows:

ESTIMATED CONTAMINATED SOIL VOLUME

Decontamination Objective (ppm-PNA's)	Volume (Cubic Yards)
1 ppm	267,000
10 ppm	51,000
100 ppm	35,400
1000 ppm	25,500

3. Alluvial Remnant Assessment - The purpose of this task was to identify the extent and configuration of alluvial remnant material separating the French Lagoon and the Riverdale water supply wells. The degree of hydraulic communication that exists across this alluvial remnant material was also assessed.

Clay material in the Alluvial remnant area may have originated from the underlying Beaumont Formation, but it has been reworked and mixed with sand to such an extent that it does not retain compositional qualities of the parent formation. The discontinuous configuration of the remnant, combined with the composition of its material was found to retard but not prevent future lateral contaminant migration between French Limited and the Riverdale.

4. Deep Aquifer Hydrogeologic Assessment - Previous geologic investigations have suggested that a confining aquitard exists under the French Limited Lagoon that hydrologically isolates the shallow Alluvial zone from the regional Deep Aquifer. However, the previous investigations also detected trace level contamination in the first Deep Aquifer below the site.

This task was designed to provide supplemental geologic, hydrogeologic, and chemical analysis information to support a detailed analysis of the aquitard's hydrologic integrity. Additionally the investigation would identify the source and extent of trace contamination in the Deep Aquifer.

Performance of these investigations resulted in a conclusion that the aquitard does prevent vertical migration of contaminants from the Alluvial zone into the Deep Aquifer. It was further determined that trace contamination existing in the Deep Aquifer had migrated downward by means of leakage around certain of the artificial penetrations in the area. Additionally, the investigations provided hydrogeologic characteristic data for both the shallow and Deep Aquifers.

1.0 INTRODUCTION

Several field investigations have been conducted at the French Limited Superfund site since December, 1982. These investigations have been documented in various reports. The most recent consolidation was published as the Draft CERCLA Remedial Investigation (RI) Report in June, 1986. This draft was subsequently accepted by EPA, as the final RI Report for the site, pending resolution of certain issues to be addressed in the 1986 field investigation. A significant technical data base has been generated by these previous investigations, and numerous conclusions have been drawn, as reported in the draft RI report.

Some data interpretations have been modified after detailed technical review by the Environmental Protection Agency (EPA) and the French Limited Task Group. In general, this review has resulted in a common interpretation of the factual data base. However, there are certain areas where limited and/or conflicting data were developed during the various investigatory programs. As a result, a 1986 Field Investigation Program was proposed by the French Limited Task Group and approved by the EPA, to broaden the technical data base in four specific areas. A brief description of these four expanded investigative areas is as follows:

- Identify the maximum PCB concentration in the lagoon sludges, and assess the possibility of segregating sludges containing different PCB concentration levels.

- Identify the volume of contaminated soils underlying and surrounding the lagoon sludges.
- Identify the extent and configuration of an alluvial remnant (buried clay ridge) within the alluvium separating the French Limited Lagoon and Riverdale water supply wells, and assess its impact on the hydraulic connection of the two locations, through the shallow aquifer.
- Assess the The hydrogeology of the deep aquifer located approximately 120 feet below grade at the site, and provide identification of contaminant migration pathways which might impact it.

The purpose and scope of the 1986 field investigation is further described in the following sections, which also include the results of the various tests and analyses.

An overall plan view of the French Limited site is shown on the Plate 1 - Base Map in Attachment 1. The location of the various monitor wells at the site are also included.

All field tasks and analytical programs were conducted in accordance with existing safety and QA/QC procedures developed and used during previous field investigation activities at the French Limited site.

2.0 ASSESSMENT OF LAGOON SLUDGE PCB CONCENTRATIONS

2.1 Purpose of PCB Concentration Survey

Previous investigations have established that PCB contamination exists at the French Limited site, and that the higher concentrations of PCBs tend to be located in the far western portion of the lagoon. However, the previous sampling and analytical programs lacked sufficient detail to determine the optimum disposal method requirements for the PCB contaminated sludges.

The 1986 PCB Sampling and Analysis Survey was designed to provide detailed PCB concentration information. The survey, established in a lateral and vertical grid pattern, covered the far western end of the lagoon where maximum PCB concentrations are indicated. The PCB concentration data obtained in this survey will then be available to prepare a PCB disposal plan that segregates and isolates sludges containing high PCB concentrations (over 500 ppm) from those containing lower concentrations, should this be required.

This survey incorporated a program of sample splits for analysis at three different laboratories, and repeat analysis of the same samples at one of the laboratories in order to establish a data base illustrating the degree of variability in analytical results obtained from the same samples.

2.2 Scope of PCB Concentration Survey

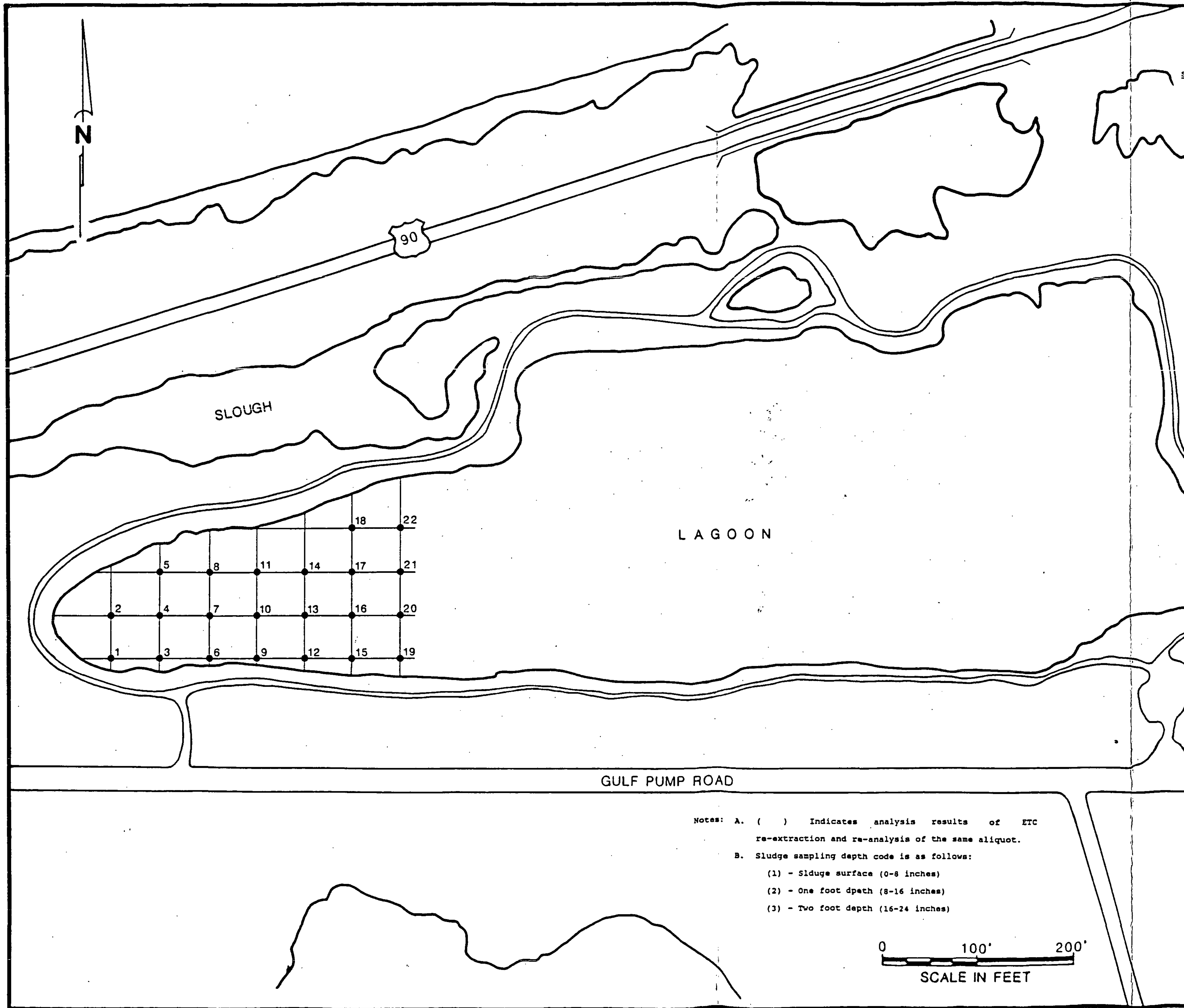
2.2.1 Sludge Sample Collection - After PCB concentration information from previous investigations was reviewed, it was determined that a sample grid extending eastward 350 feet from the western end of the lagoon would cover the area where PCB concentrations over 500 ppm might be expected. A sampling grid was established in that area of the lagoon on approximately 50 by 50 foot centers. Samples were collected at 22 locations on this grid, as shown in Figure 2-1, at the following depths:

Depth 1 - Sludge surface samples (0 to 8 inches)

Depth 2 - One foot depth samples (8 to 16 inches)

Depth 3 - Two foot depth samples (16 to 24 inches)

Collection of samples was accomplished using a 2-inch PVC piston sampler to retrieve 24-inch long sample cores from the lagoon sludge. Samples from each of the three depth intervals were extruded into individual stainless steel compositing bowls and blended prior to placement into specially prepared sample containers. Consistent with approved sampling protocol, all sample collection and compositing equipment was decontaminated between samples using rinses of a detergent, water, acetone, and then water.



LAGOON SLUDGE
PCB ANALYTICAL RESULTS

Sample Point	Depth	TOTAL PCB'S (ppm) ETC	Rocky Mountain	Radian
1	1	105 (277)	77	360
	2	73.1		
	3	315 (353)		
2	1	59.5		
	2	14.6	28	38
	3	20.5		
3	1	ND		
	2	28.7		
	3	17.8	3.3	12
4	1	44.9	57	84
	2	72.1		
	3	39.4		
5	1	21.7		
	2	21.7		
	3	4.7		
6	1	32.9		
	2	37.7		
	3	20.6		
7	1	24.4		
	2	4.18		
	3	16.6		
8	1	25	9.3	28
	2	ND		
	3	ND		
9	1	ND		
	2	ND(31)	34	120
	3	ND		
10	1	35.8		
	2	7.57		
	3	17.7		
11	1	7.17		
	2	ND	2.3	3.8
	3	15.2		
12	1	243 (471)		
	2	693 (144)		
	3	244 (151)		
13	1	19.3		
	2	ND	36	48
	3	6.67		
14	1	41.4		
	2	40.3		
	3	13.5		
15	1	98.6 (200)		
	2	No Sludge		
	3	No Sludge		
16	1	21.4		
	2	3.42		
	3	8.70		
17	1	9.45		
	2	3.46	2.0	2.4
	3	ND		
18	1	34.4		
	2	41.6		
	3	No Sludge		
19	1	8.96		
	2	38.5		
	3	No Sludge		
20	1	10.58	6.1	37
	2	12.3		
	3	13.1		
21	1	ND		
	2	ND		
	3	ND		
22	1	2.88		
	2	ND		
	3	No Sludge		

Notes: A. ( ) Indicates analysis results of ETC re-extraction and re-analysis of the same aliquot.

B. Sludge sampling depth code is as follows:

(1) - Slduge surface (0-8 inches)

(2) - One foot dpeth (8-16 inches)

(3) - Two foot depth (16-24 inches)

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FIGURE 2-1
LAGOON SLUDGE
PCB SAMPLING LOCATIONS
AND RESULTS
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The grid consisted of 22 sampling locations, with 3 sampling depths at each location, resulting in a total of 66 samples. However, there were 5 sample points that had no sludge present; thus, no samples were collected.

Of the 61 samples collected, 10 were randomly selected to be analyzed by 2 separate independent laboratories specified by the EPA (Radian and Rocky Mountain), in addition to being analyzed in the laboratory that performed the analytical work for REI (Environmental Testing and Certification - ETC). Each of these 10 sample splits was taken simultaneously from the same homogenized composites, and placed into identically prepared containers. Complete chain-of-custody documentation accompanied each individual sample.

After receipt of the analytical results from the three laboratories, ETC was requested to re-extract and re-analyze seven samples. These samples were randomly selected by REI, but they included two samples that had previously been analyzed by all three laboratories and five samples that had been analyzed only by ETC. The location and depth's of the samples that were analyzed by all three laboratories, and those that were re-analyzed by ETC is shown on Figure 2-1.

2.2.2 <u>Laboratory PCB Analysis Method Control</u>

To ensure results were comparative from the three laboratories performing PCB analyses, the sample preparation, extraction, and analysis methodologies were specified to all laboratories. These procedural instructions are shown in Appendix 1. All samples were analyzed using Gas Chromatograph/Electron Capture Detector (GC/ECD) techniques, with results reported in dry weight concentrations.

2.3 PCB Concentration Analysis Results

The results of the PCB analysis of lagoon sludge are summarized on Figure 2-1. Presented are analytical results from the three laboratories and the lagoon grid pattern for reference regarding sample location. Data provided in parentheses under the ETC column show the analytic results for samples which were re-extracted and re-analyzed by ETC.

The laboratory reports are provided in the following Appendices:

Appendix 2 - ETC PCB Analytical Results

Appendix 3 - Rocky Mountain PCB Analytical Results

Appendix 4 - Radian PCB Analytical Results

A review of the analytical data presented in Section 2-3 was performed to evaluate the statistical significance of the results. This evaluation verified that all results for sample splits analyzed by all three labs were statistically valid. A statistical evaluation of the results where only two analyses data points are available can not be performed.

2.4 PCB Concentration Assessment Conclusions

Review of the analytical data leads to the following conclusions regarding the PCB concentration survey of the French Limited Site.

- Only one (1) sample (Location 12 - Depth 2) location reflected a PCB concentration over 500 ppm. This sample, from the 8 to 16 inch depth, reported 693 ppm PCBs.
  However, when this sample was re-extracted and re-analyzed, it reported a 144 ppm PCB concentration. The variability of analytical results at this sample point precludes a firm conclusion that the concentration exceeds 500 ppm.
- Only three (3) sample locations (Locations 1, 12 and 15) indicate PCB concentrations over 100 ppm.
- It is clearly feasible to remove the "spot" of sludge at sample Location 12 from the lagoon, separately from the remaining sludge. Should it become necessary. This ability to segregate sludge that contains a PCB concentration in excess of 500 ppm would allow a separate and/or different remedial method as compared to the method used for the remaining sludge.

- Comparison of the sludge's PCB concentration analytic results from the three laboratories, and the re-analysis by ETC, indicates a degree of variability. However, study of the data does show that high PCB results were present at sample Location 12 and re-analysis also showed relatively high concentrations. Low concentrations shown in the first analysis tended to be confirmed (Sample Location 9) by the re-analysis.

3.0 ASSESSMENT OF CONTAMINATED SOIL VOLUMES

3.1 Purpose of Contaminated Soil Volume Survey - Several estimates of the volume of contaminated soils underlying the French Limited Site have been developed during previous field investigations. These estimates were based on visual observation, limited analytical quantification of soil contaminants, and assumed decontamination objectives. The most recent lagoon boring program (1985) obtained gas chromatography/mass spectroscopy (GC/MS) analytical data for underlying soils. The data indicates that base/neutral priority pollutants, specifically polynuclear aromatics (PNAs), could be an acceptable indicator of contamination due to their mobility and persistence in the subgrade soil environment. The volume estimate reported in the 1985 Remedial Investigation Report was based upon an assumed decontamination objective of 1 ppm PNAs.

The purpose of this 1986 assessment is to develop additional soil contamination analytical data and use it, in combination with the existing data to update the underlying and surrounding contaminated soil volume calculation.

3.2 Scope of Contaminated Soil Volume Survey - Previous studies (lagoon borings and resistivity profiling) at the site have indicated that the permeable strata adjacent to the lagoon may be pathways of radial contaminant migration. To better define the extent of this migration, and thus better quantify the contaminated soil volumes, samples from ten (10) borings located around the perimeter of the lagoon were collected to augment the analytical data base. Additionally, soil samples were taken during the installation of two (2) monitor wells (REI 10-3 and REI 11).

Due to the hydraulic pressures present in the subgrade sand zones, hollow stem auger equipment could not be utilized for advancing these borings, as was specified in the project work plan. Instead, rotary wash techniques were used. Soil samples were collected using split spoon and Shelby tube samplers on a continuous basis from the surface to the depth at which the confining clay stratum was encountered. Samples from each boring were selected for chemical analysis based upon a combination of visual inspection, HNU screening, and physical observation of stratum breaks between permeable zones and clay strata.

All samples for chemical analysis were placed into pre-cleaned 16 ounce wide-mouthed jars, refrigerated, and transported to the laboratory for analysis. Split samples were offered to the EPA for their independent analysis.

Following completion, each boring was pressure grouted to the surface with a cement/bentonite slurry and all drilling fluids and cuttings were placed into the lagoon. Logs of these borings are shown in Appendix 5. The locations of these borings and the monitor wells that were sampled are shown on Figure 3-1.

In addition to the 60 samples collected during the dike boring program, soil samples retained from the 1985 Field Investigation were analyzed to quantatively identify some of the base/neutral (PNA) contaminants present. The location of these 1985 lagoon borings is also shown on Figure 3-1.

The volume of contaminated soil was calculated using base/neutral organics concentrations as the indicator parameter. Separate calculations were performed using 1, 10, 100 and 1000 ppm as the decontamination objective.

3.3 Soil Analysis - All samples were analyzed using standard GC/MS techniques for base/neutral priority pollutant compounds in soils.

3.4 Contaminated Soil Volume Results - Analytical results of the subgrade dike soils and the retained samples from the 1985 lagoon boring program are shown on Figure 3-1. Laboratory reports for the contaminated soil analyses are provided in Appendix 6.

These data indicate that a large percentage of the soils which constitute the earthen dike have less than 1 ppm of base/neutral organic contamination (PNAs). Additionally, only two dike boring locations exhibited total base/neutral concentrations in exess of 10 ppm. The volumes of contaminated soil calculated in the 1985 Remedial Investigation report were based upon the assumption that all of the soils within the dike volumes were contaminated with organics over 1 ppm.

SOIL CONTAMINATION ANALYSIS

BORING	SAMPLE DEPTH (Feet MSL)	PNA's (ppm)
DB-1	-14.7 to -16.7	ND
	-18.7 to -20.7	0.84
	-26.7 to -28.7	ND
	-30.7 to -32.7	0.64
	-42.7 to -44.7	ND
	-46.7 to -48.7	ND
DB-2	-14.6 to -16.6	ND
	-20.6 to -22.6	0.52
	-24.6 to -26.6	ND
	-30.6 to -32.6	ND
	-34.6 to -36.6	ND
DB-3	-15.1 to -17.1	ND
	-29.1 to -31.1	ND
	-31.1 to -33.1	ND
	-33.1 to -35.1	ND
DB-4	-12.5 to -14.5	ND
	-18.5 to -20.5	ND
	-22.5 to -24.5	ND
	-28.5 to -30.5	ND
	-32.5 to -34.5	ND
	-38.5 to -40.5	ND
DB-5	+5.9 to +3.9	1.6
	-10.1 to -12.1	ND
	-16.1 to -18.1	ND
	-24.1 to -26.1	ND
	-32.1 to -34.1	ND
	-42.1 to -44.1	ND
DB-6	+2.2 to +0.2	ND
	-13.8 to -15.8	0.07
	-23.8 to -25.8	ND
	-33.8 to -35.8	ND
	-37.8 to -39.8	ND
DB-7	-12.5 to -14.5	ND
	-24.5 to -26.5	ND
	-28.5 to -30.5	ND
	-32.5 to -34.5	ND
	-42.5 to -44.5	ND
DB-8	-13.1 to -15.1	ND
	-19.1 to -21.1	ND
	-21.1 to -23.1	4.08
	-35.1 to -37.1	ND
	-41.1 to -43.1	ND
DB-9	-17.3 to -19.3	4.9
	-25.3 to -27.3	0.25
	-31.3 to -33.3	2846.5
	-39.3 to -41.3	.5
DB-10	-14.1 to -16.1	0.48
	-20.1 to -22.1	0.60
	-28.1 to -30.1	2.0
	-36.1 to -38.1	ND
REI 10-3	+10.4 to +12.4	271
	-9.6 to -11.6	2.4
	-14.6 to -16.6	2.0
	-24.6 to -26.6	0.7
	-34.6 to -36.6	0.6
	-48.6 to -50.6	ND
REI-11	-18.1 to -20.1	ND
	-22.1 to -24.1	ND
	-38.1 to -40.1	0.67
	-40.1 to -42.1	1.54
LB-01	-12.4 to -13.9	0.459
	-13.9 to -15.9	1.148
	-15.9 to -17.9	1.257
	-17.9 to -19.9	1.521
LB-02	-16.5 to -18.5	1650.000
	-20.0 to -21.5	2.066
	-22.0 to -23.5	4.097
	-24.0 to -25.5	1.182
	-27.5 to -29.0	ND
	-29.0 to -31.0	0.462
	-31.0 to -32.5	0.462
LB-03	-15.0 to -17.0	1.342
	-17.0 to -19.0	ND
	-19.0 to -21.0	ND
	-23.0 to -25.0	ND
	-25.0 to -27.0	3.60
	-27.0 to -29.0	0.333

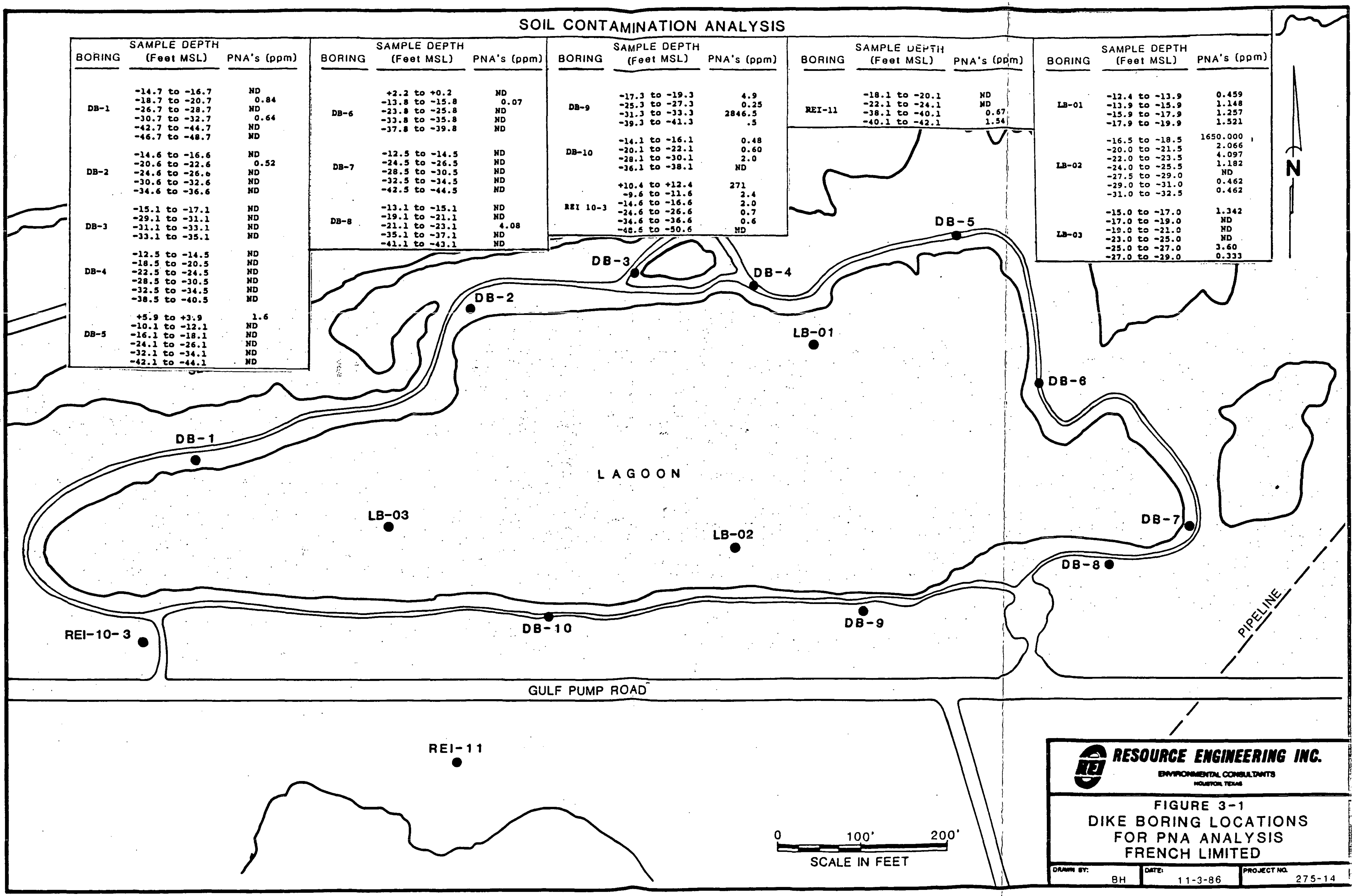

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FIGURE 3-1
DIKE BORING LOCATIONS
FOR PNA ANALYSIS
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The 1986 estimates of the contaminated soil volumes were made based on decontamination objectives of 1, 10, 100 and 1000 ppm. The calculations for each of the four cases were made by utilizing the known dimensions of the lagoon, and the depth of contaminated soil as determined from the soil analysis data. Detailed calculations for the four cases are provided in Appendix 7.

The results of these calculations are summarized in Table 3-1 as follows:

Table 3-1
Estimated Contaminated Soil Volumes

Decontamination Objectives (ppm-PNAs)	Volume (cubic yards)
1 ppm	267,000
10 ppm	51,000
100 ppm	35,400
1000 ppm	25,500

These estimates show a 523% decrease in the volumes of contaminated soil when the decontamination objective is increased from 1 ppm to 10 ppm. The relative difference in contaminated soil volumes is still significant (60% decrease) when the decontamination objective is raised from 10 ppm to 100 PNAs. A 72% decrease occurs when the decontamination objective is raised from 100 ppm to 1000 ppm PNAs.

The significance of choosing a decontamination objective on the volume of contaminated soils is illustrated in the contaminated soil volume table (Table 3-1). Typical choices for PNA decontamination objectives (i.e., 100 or 1000 ppm) has a relatively insignificant impact on the volume of soil considered to be "contaminated."

4.0 ALLUVIAL REMNANT ASSESSMENT

4.1 Purpose - The purpose of the Alluvial Remnant Assessment Task in the French Limited site 1986 Field Investigation Program was to identify the extent and configuration of alluvial remnant material separating the waste lagoon and the Riverdale water supply wells. The study also assesses the impact of the alluvial remnant material on the hydraulic connection between the shallow aquifer in these two locations.

Subsurface field investigation programs conducted at the French Limited site have produced much information describing the shallow geology (< 50 feet) immediately adjacent to the waste lagoon; however, the details of that geologic data base decrease significantly outside the immediate vicinity of the lagoon.

A previous interpretation of the depositional history within the alluvium tentatively suggested that there may be two geologically recent, parallel, alluvial channels segregated by an older, less permeable, alluvial remnant deposit. This tentative interpretation, based upon limited stratigraphic and soil property data, suggested that this remnant deposit could possibly provide a natural containment and migration barrier between the French Limited site's lagoon and the Riverdale water well locations. The 1986 assessment task is designed to augment the geologic data base of the area between the lagoon and Riverdale, and to accurately describe the alluvial remnant materials structure. The interpretive tools used to delineate the remnant's configuration and structural extent included cone penetrometer soundings, soil confirmation borings, electric borehole geophysics and geotechnical soils analysis.

4.2 Procedure

4.2.1 Phase I - The first phase of the alluvial remnant material's assessment consisted of a cone penetrometer survey of twenty-eight (28) soundings (CPT-1 through CPT-28) set on three traversals between French Limited and Riverdale. The locations of the penetrometer soundings are shown on Plate 2 in Attachment 2. Each sounding was pushed to a depth of 70 feet, or until cone refusal, and was pressure grouted upon completion of the penetration. Subsequent sounding locations were selected by inferring the lithology from the computerized field reports of sleeve friction and tip resistance. These were plotted on the computer housed inside the cone penetrometer truck.

4.2.2 Phase II - The second phase of the assessment program consisted of installing eight (8) confirmation borings (R-1 through R-8). These borings were placed adjacent to cone sounding locations to provide validation of the inferred lithologic materials and to obtain soil samples for geotechnical analysis. See Plate 2 in Attachment 2 for the boring locations. A mud rotary drilling rig, using a potable water and bentonite powder as a mud, was used to advance the borings. Each boring was continuously sampled, visually logged and electric logged, (resistivity, spontaneous potential, gamma and neutron) to a depth of 60 feet. All borings were pressure grouted with a cement-bentonite slurry on completion of the geophysical logging. The visual description of each confirmation boring, its geophysical log, and nearest cone sounding log are presented in Appendix 8. The confirmation boring and its corresponding cone penetrometer sounding are as follows:

Cone Sounding	Corresponding Confirmation Borings
CPT-10	R-1
CPT-2	R-2
CPT-4	R-3
CPT-6	R-4
CPT-17	R-5
CPT-18	R-6
CPT-21	R-7
CPT-24	R-8

The logs for all the cone penetrometer soundings (CPT-1 through CPT-28) are shown in Appendix 9.

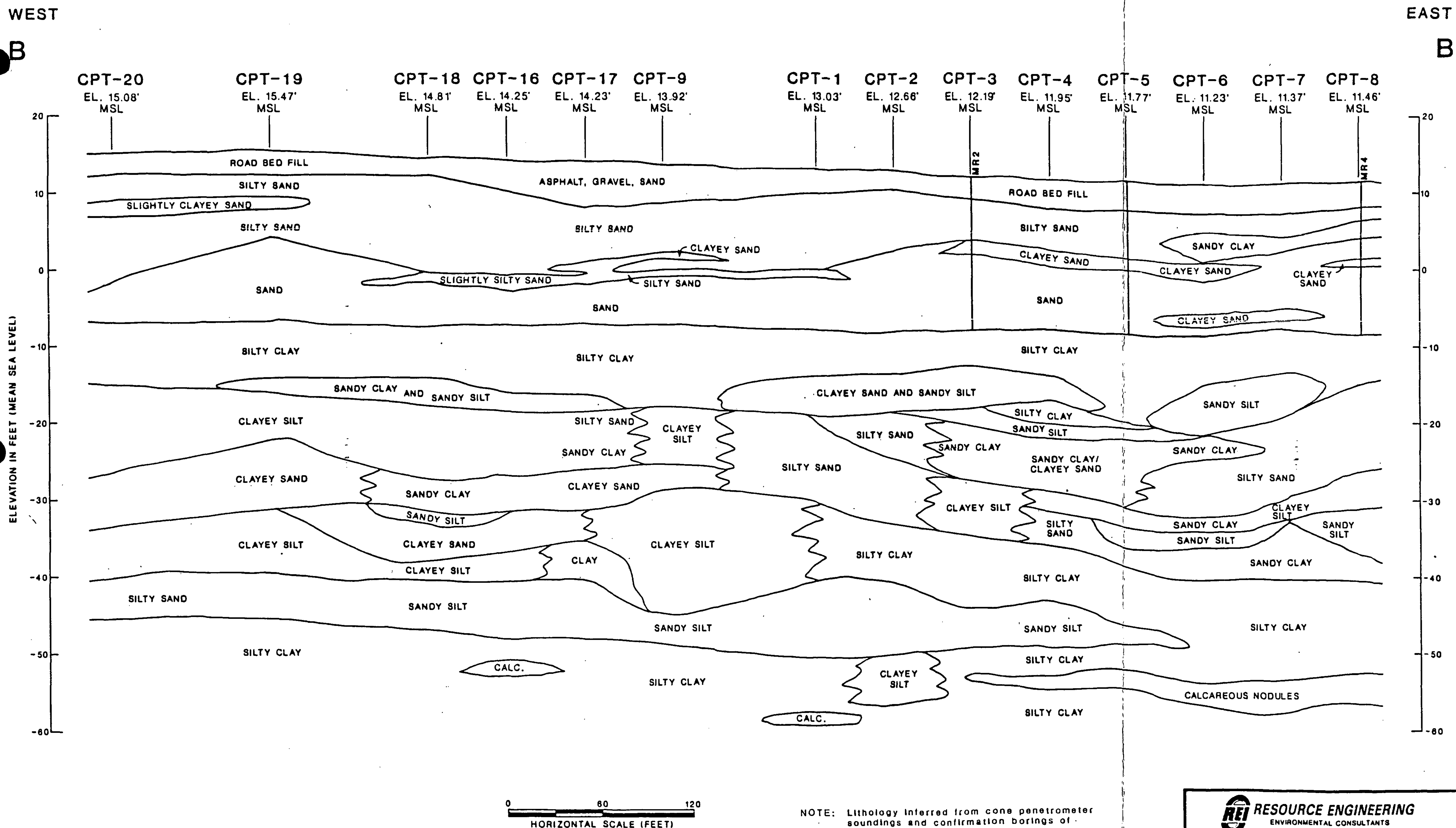
Soil samples were retained while drilling the confirmation borings and analyzed for their appropriate geotechnical properties. Sandy soils were sieved to determine their grain size; clays and silts were analyzed by direct shear analysis and Atterberg limit determinations. The geotechnical test reports are presented in Appendix 10.

4.2.3 Phase III - In the third phase of the program, four piezometers (MR-1 through MR-4) were installed in the upper alluvial sand, with the mud rotary drilling rig. The locations of these piezometers are shown on Plate 2 in Attachment 2. The piezometers were constructed of 4-inch flush-jointed PVC Schedule 40 pipe with a Triloc 0.010-inch slotted screen. The top of each casing was notched to provide a common reference point for water level measurements and surveyed for its elevation to Benchmark NGS #S109, 1984. Construction details for each piezometer are presented in Appendix 11. The purpose of the piezometers was to allow water level measurement in the uppermost aquifer at points in the alluvial deposit area. These water level readings were then used in assessing the degree of hydraulic separation across the alluvial remnant material.

4.3 Results - Since a predominantly clay formation such as th0000000000000000000ted to subareal dessication and compaction, its soil properties change. Although the Beaumont may be the parent material for the alluvial remnants, the alluvial material has been reworked, winnowed, and placed in a different depositional environment than its parent formation. Using this hypothesis, one possible method to identify the contact between the Beaumont formation and the overlying clay soils or remnant material is to examine the cone penetrometer and geophysical logs for baseline shifts. Baseline shift occurs when the physical and qualitative properties of a unit are markedly different from those of an adjacent unit, even though the units may be lithologically similar.

Cone penetrometer sounding traversals were set along Gulf Pump Road, along Hickory Street in Riverdale, and on a north-south line tangent to GW-02 and GW-07, as shown on Plate 2 in Attachment 2. Cross-sections based on interpretations of the sounding traces, using baseline shifts and confirmation borings as correlation aids, are shown in Figures 4-1, 4-2 and 4-3.

By compiling the information from the cone penetrometer survey, the confirmation borings, the geotechnical tests, and the data from previous investigations, a more detailed interpretation of the extent and configuration of the alluvial remnant material can be made. An interpretation of the cross-sections constructed from the cone penetrometer soundings suggests that parallel alluvial channels "etch" the surface of the Beaumont clay as they increase both their sinuosity and meandering across the eroded penneplain. Between these channels exist older alluvial deposit remnants. These deposit remnants consist of reworked clay alluvium which uncomfortably overlies the Beaumont formation and is incised by minor sand channels. The minor channels move eastward as the sinuosity of the oxbow channel increases. These channels were later covered with silt and clay when the oxbow was starved by the meandering stream. A careful analysis of the cone



NOTE: Lithology inferred from cone penetrometer soundings and confirmation borings of The 1986 Field Investigation.

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FIGURE 4-1
1986 FIELD INVESTIGATION
CROSS SECTION B-B'
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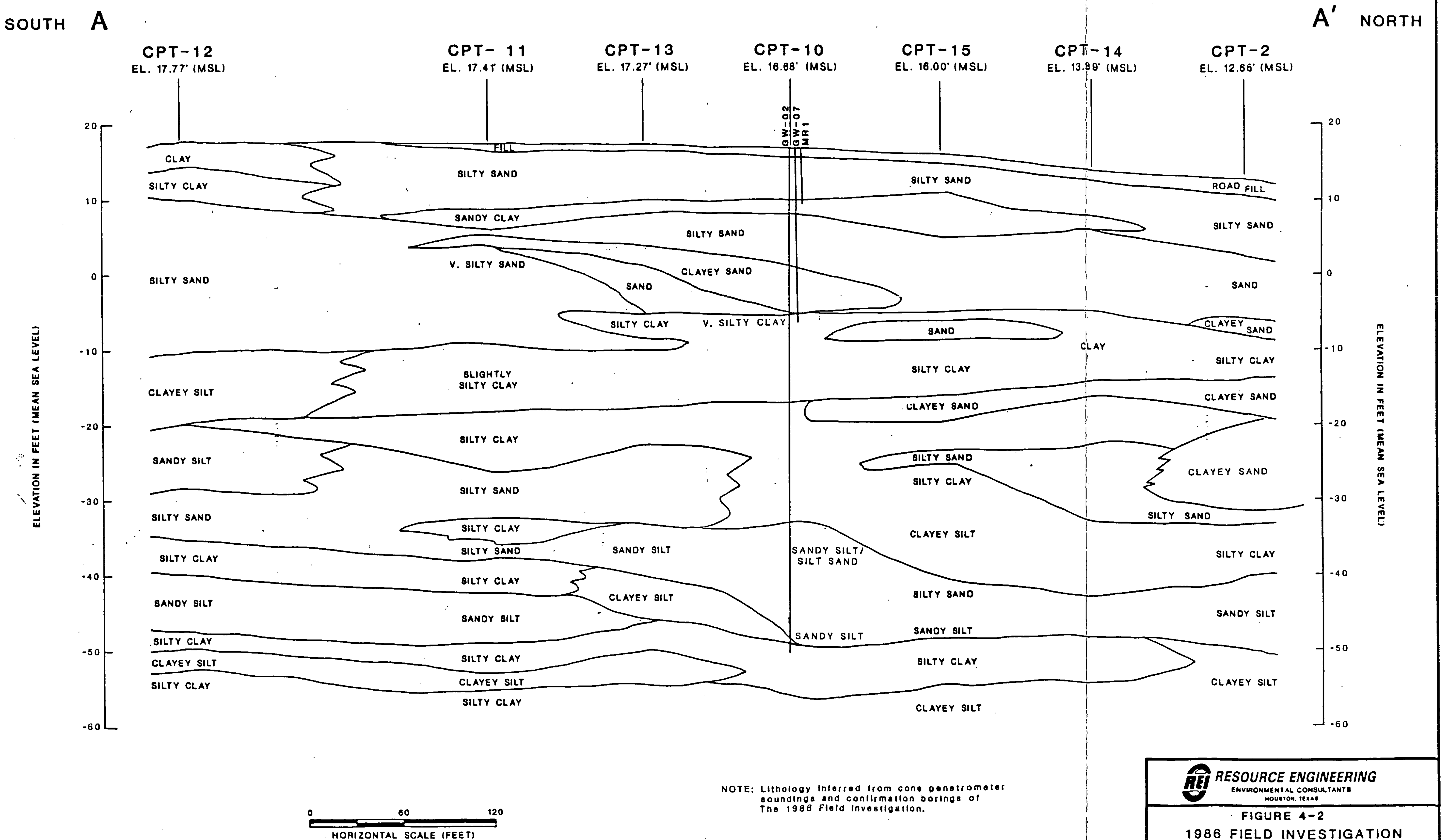

NOTE: Lithology inferred from cone penetrometer soundings and confirmation borings of The 1986 Field Investigation.

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FIGURE 4-2
1986 FIELD INVESTIGATION
CROSS SECTION A-A'
FRENCH LIMITED

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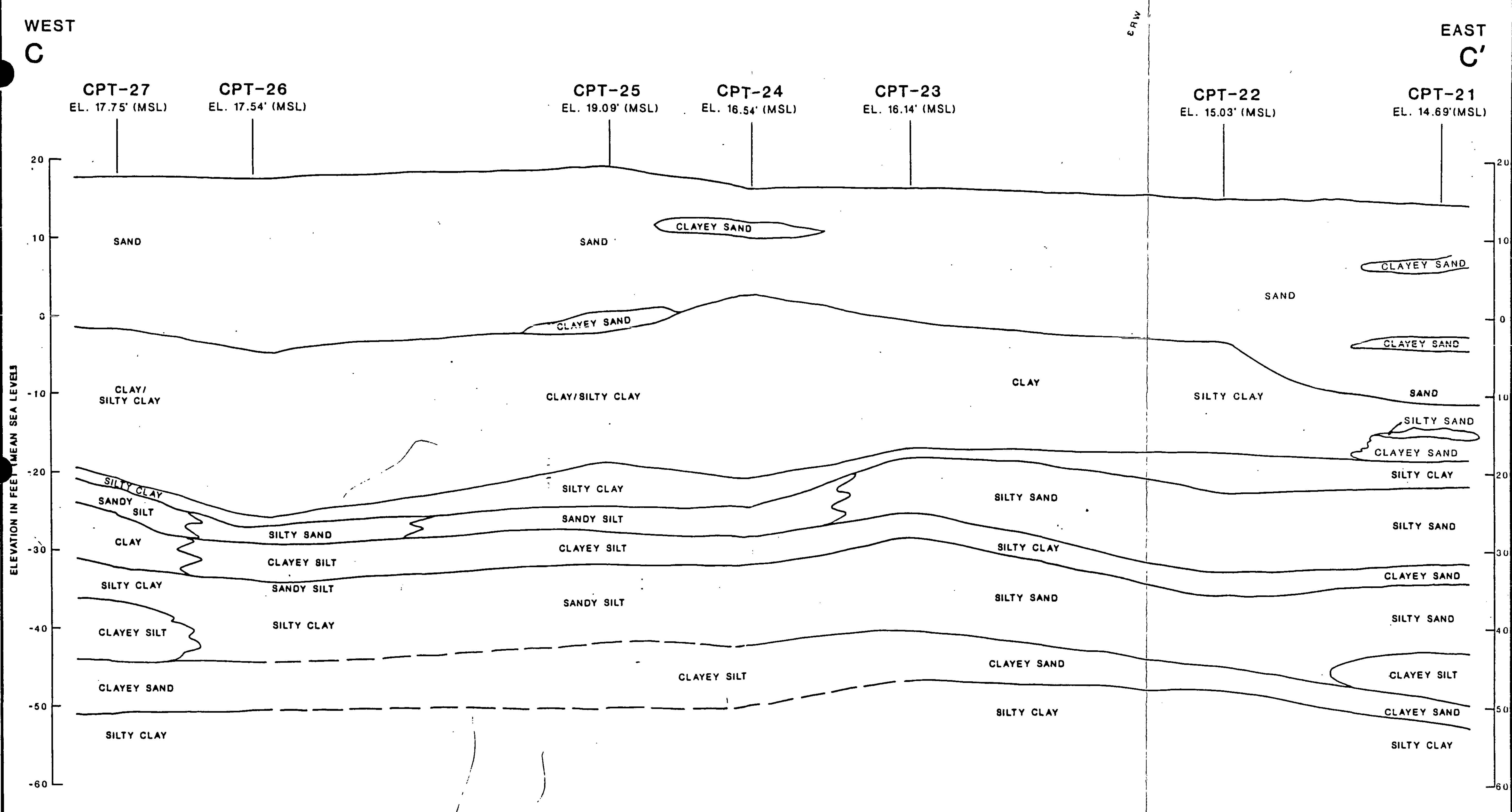

NOTE: Lithology inferred from cone penetrometer soundings and confirmation borings of The 1986 Field Investigation.

0 60 120
HORIZONTAL SCALE (FEET)

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FIGURE 4-3
1986 FIELD INVESTIGATION
CROSS SECTION C-C'
FRENCH LIMITED

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penetrometer sounding traces confirm the geologic makeup of the material above the Beaumont clay is a complex assembly of interfingered sand and clay-based materials. Although the material encountered at CPT 10 (adjacent to GW-02 and GW-27) confirmed boring logs from previous investigations, the geometry of the remnant as previously interpreted could not be confirmed. The composition of the material at -15 to -50 MSL has clay as a major component at some cone penetrometer sounding points, however, the clay content of this zone varies both in thickness and continuous aereal extent.

Geotechnical tests performed on the soil samples retained from the confirmation borings indicate the alluvial remnant material is of a different grain size and composition from the underlying Beaumont formation. The alluvial remnant material is coarser and has a lower liquid limit, plastic limit, and plasticity index than the Beaumont clay material. Grain size analysis of sand taken from a confirmation boring (R-8) in Riverdale showed the sand to be finer and more silty than sand taken from a different channeling event which occurred across the bulk of the remnant material near the French Limited site (R-2 and R-3). A summary of the geotechnical testing results for each sample interval are listed in Table 4-1, and complete test reports are shown in Appendix 10.

TABLE 4-1

ALLUVIAL REMNANT MATERIAL
SUMMARY OF GEOTECHNICAL ANALYSIS DATA

French Limited Sand

Boring	Depth (ft.)	#60 Sieve % Retained
R-2	8-10	91.2
R-2	10-12	94.9
R-3	4-6	62.6
R-3	14-16	70.8

Riverdale Sand

Boring	Depth (ft.)	#60 Sieve % Retained
R-8	4-6	40.8

Alluvial Remnant Material

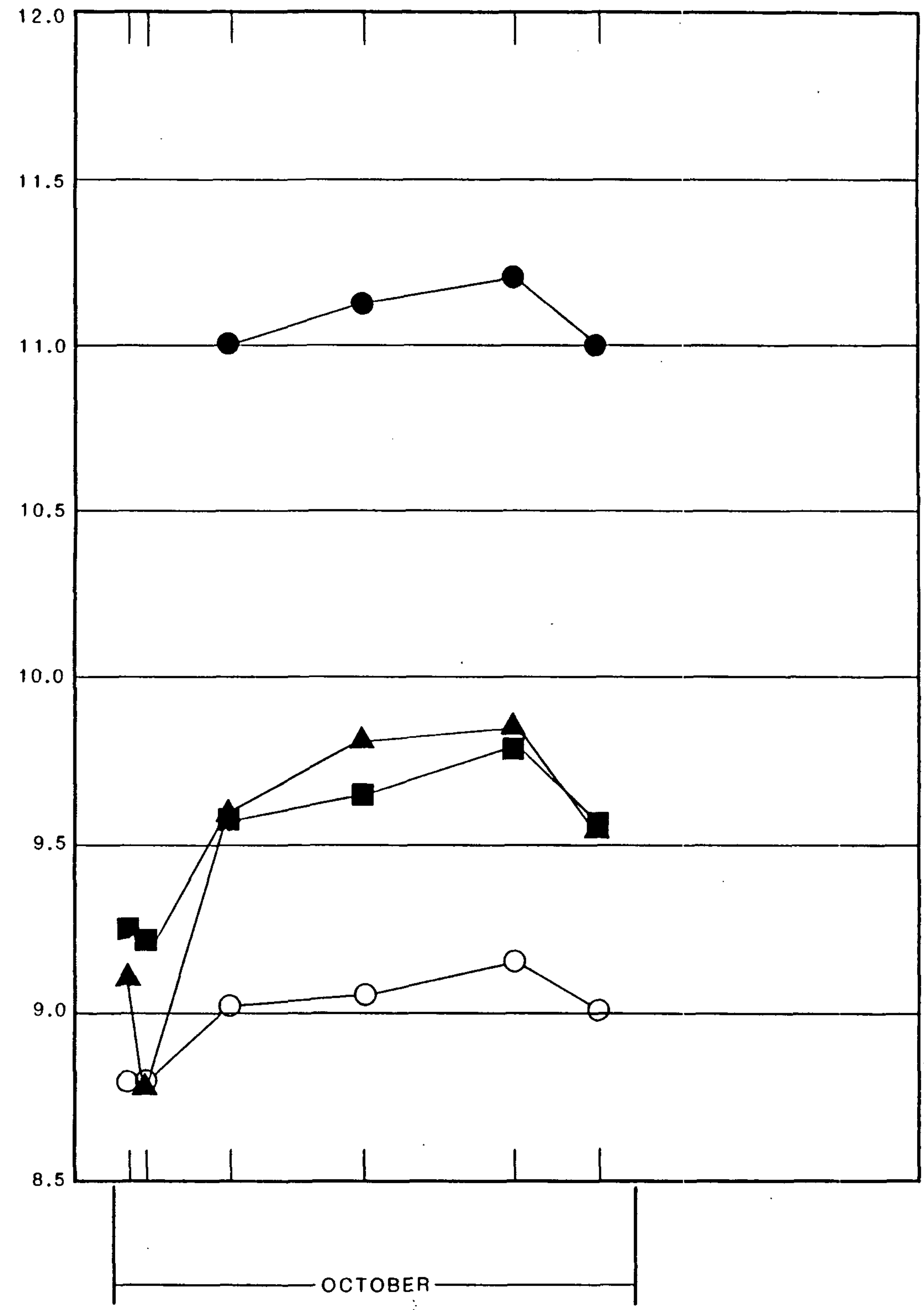
Boring	Depth (ft.)	Liquid Limit	Plastic Limit	Plastic Index	% Less Than #200
R-2	22-24	49.5	16.8	32.7	20.3
R-2	38-40	-	-	-	25.0
R-3	22-24	41.0	15.7	25.3	-
R-3	34-36	25.2	13.9	11.3	47.0
R-8	22-24	41.5	15.2	26.3	-
R-8	40-42	24.0	15.7	8.3	35.1

Beaumont Clay Upper Contract

Boring	Depth (ft.)	Liquid Limit	Plastic Limit	Plastic Index	% Less Than #200
R-2	48-50	-	-	-	20.5
R-3	46-48	66.0	27.4	38.6	-

A study of the near surface sand deposits in the French Limited alluvial zone indicates there is an unconfined sand with up to two buried artesian channel sands. All sands above the Beaumont Formation appear to have a weak hydraulic connection. This connection is illustrated by the hydrograph of the water levels of the four Riverdale piezometers. (See Figure 4-4). The water levels of these four piezometers were affected in a similar fashion by atmospheric events such as rainfall, drought, and barometric pressure over the period of measurement in October, 1986. Piezometer MR-1 (total depth, 8 feet) was set near GW-07, a well screened in the upper permeable zone (14 to 24 feet below surface) to determine whether the sand seam detected on cone penetrometer traces yielded a change in hydrostatic head. Preliminary water level readings have shown a difference in head of at least two feet between the two wells. (See Figure 4-5.)

4.4 <u>Conclusions</u> - Clay material found approximately 20 feet below the surface may have originated from the Beaumont Formation; however, it has been reworked and mixed with sand to such an extent that it does not retain compositional qualities of the parent formation. Although the methods and



10-1 CLUSTER PUMP TEST 10/04/86 - 10/14/86

	MSL (T.O.C.)
● MR-1	18.75
▲ MR-2	13.28
■ MR-3	11.69
○ MR-4	12.45

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FIGURE 4-4
HYDROGRAPHS RIVERDALE
PIEZOMETERS (OCTOBER, 1986)
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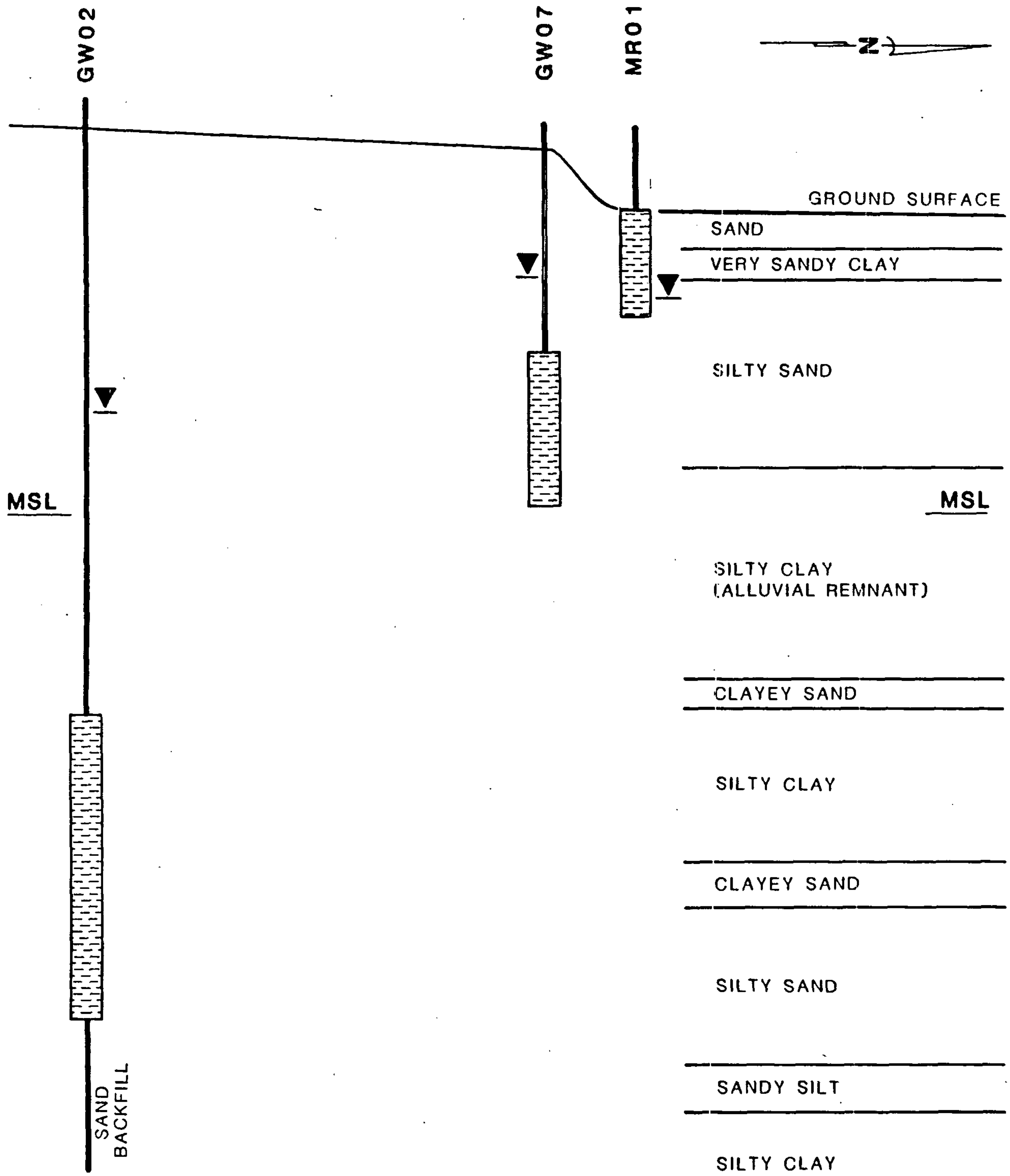

STRATIGRAPHY GENERALIZED FROM CONFIRMATION BORING R-1, ADJACENT TO CPT 10.

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FIGURE 4-5

WATER LEVELS - 10/29/86

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RLS	11/5/86	275-14-06

characteristics of the deposition of the alluvial remnant material represent a standard geologic model for a fluvial system, the discontinuous configuration of the material is not adequate to provide an absolute unqualified lateral migration barrier between French Limited and Riverdale. The presence of this material and other interspersed clay, sand, and silt seams does provide localized, hydraulic separation. Supply wells in the shallow alluvium (less than 50 feet) would have to overcome these localized anomalies with an extremely high pumping rate, over an extended period to induce water from the French Limited site into the Riverdale home supply wells.

5.0 DEEP AQUIFER HYDROGEOLOGY ASSESSMENT

5.1 Purpose - The existence of a confining aquitard beneath the French Limited Lagoon, that would hydraulically isolate the alluvial zone from the regional Deep Aquifer, is important in evaluating several potential remedial alternatives for the site. Previous geologic investigations have suggested that such an aquitard exists, and that its hydraulic integrity will prevent the vertical migration of contamination away from the site. However, these previous investigations also detected trace level contamination in the regional Deep Aquifer below the site. The presence of this trace contamination suggests that hydraulic communication exists across the aquitard, from either artificial penetrations or natural migration.

Review of the data base from previous investigations led EPA, and the French Limited PRP Group, to conclude that a 1986 Field Investigation should be performed to:

- First, supplement the existing geologic data base by performing a series of pumping tests designed to provide a positive "stress" test of the aquitard's hydraulic integrity in the area of the French Limited site. Additionally, while performing these pumping tests, data would be collected for calculation of the deep aquifer's hydraulic characteristics.

- Second, implement a program of ground water analysis designed to identify the source of trace contamination in the deep aquifer.

The purpose of these investigations would be to assess the integrity of the aquitard underlying the French Limited Site.

5.2 <u>Scope</u> - The investigative tasks performed during the deep aquifer hydrogeology assessment are summarized as follows:

1. Before performing the pumping tests, it was necessary to remove and seal an existing well known as the "Murphy Well." This well had been discovered previously, near an abandoned structure on the Murphy property, and was suspected of being a source of vertical hydraulic communication across the aquitard.
2. A second Deep Aquifer pumping test, referred to as the "REI-3 Cluster" test, was performed utilizing a pumping well located approximately 650 feet down gradient (south) of the French Limited Lagoon's southern shore. This was also an extended run test (3 days) designed to measure the aquitard's vertical hydraulic integrity at that location. Data were also collected for calculating Deep Aquifer characteristics.

3. The Deep Aquifer pumping test referred to as the "REI-10 Cluster" test was performed utilizing a pumping well located approximately 75 feet south of the French Limited Lagoon's southern shore. This downgradient location adjacent to the lagoon was utilized to perform an extended duration (7 day) "stress test" of the aquitard's vertical hydraulic integrity. Additionally, during the test, data were obtained for calculating Deep Aquifer characteristics.

4. During an initial attempt to perform the "REI 10 Cluster" Deep Aquifer pumping test, an anomoly was observed in the shallow aquifers hydraulic response. After review and further investigation, it was concluded that the nearby artificial penetration (Monitor Well GW-25) should be removed and sealed before proceding with the test.

5. A third Deep Aquifer pumping test identified as the "REI-12 Cluster" test, was planned utilizing a pumping well located north of Highway 90. This upgradient test was designed to stress the aquitard while observing the shallow aquifer for evidence of vertical hydraulic communication. This test was not

performed as described in the work plan. Review of the results from the REI 10-1 Run #2 Test, and the preliminary drawdown test performed on REI 12-1 concluded that this upgradient test would not greatly supplement the data already obtained from the preceding tests, so the test was eliminated.

6. Groundwater potentiometric maps of the French Limited site's Deep Aquifer were prepared using water level data from a network of old, as well as newly installed monitor wells. Two maps were prepared based on data obtained on two separate dates. The maps show the Deep Aquifer groundwater gradient, and "mounding" effects that exist in the area.

7. Groundwater samples were collected from six (6) monitor wells, and analyzed for contaminant concentrations by (GC/MS). Results from these analyses provided data to support final determination of Deep Aquifer contamination levels, and to help identify contaminant migration pathway into the Deep Aquifer.

A complete description of the activities, approach, procedures utilized, and results obtained from these investigations are described in the following sections of this report.

5.3 <u>Murphy Well Removal</u> - The 1985 Field Investigations Scope of Work included a pumping test of the Deep Aquifer utilizing a well (REI 3-4) located approximately 650 feet south of the French Limited Lagoon's southern shore. Results of this test indicated a potential boundary condition or source of artificial recharge near the pumping well. Investigation identified an abandoned water well northeast of REI 3-4 on the Murphy property. See Plate 1 in the Attachment 1 for location. The well was found beneath vegetation and rubble from the original structure on the property. The well was constructed of 3-inch galvanized steel pipe cut off beneath the surface of a small concrete pad. No grout material was in evidence at the surface of the well, and the concrete pad was not functioning as a surface seal.

The down-hole portion of a jet-pump was removed from the well without difficulty, and a cased-hole electric log was run to identify potential problems that might be encountered during removal of the well.

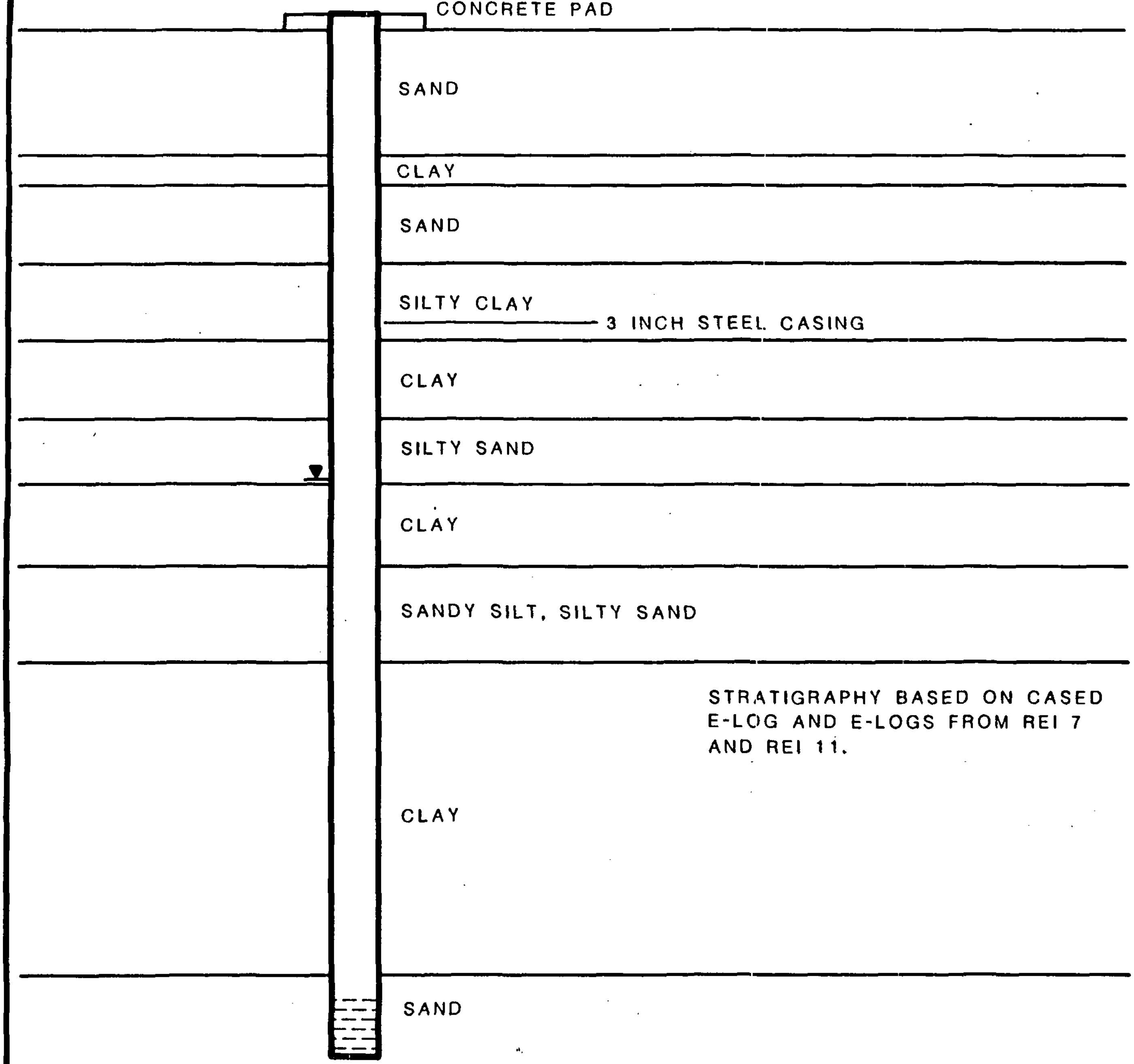
The well casing was pulled using conventional water well workover equipment. One hundred ninety (190) feet of 3-inch galvanized casing and ten (10) feet of 3-inch stainless steel screen were removed from the well bore. Close observation during removal of the casing found that no cement or grout adhered to the piping. The borehole was reamed to an 8-inch diameter with a rotary wash rig to a depth of 205 feet. Again, no evidence of grout was observed during the drilling process. The borehole was then pressure grouted to the surface using tremie rods and a neat cement. Following settling, additional cement was added to seal the borehole to the surface. Figure 5-1 illustrates the construction of the Murphy well as it was found before removal.

5.4 <u>Installation of Piezometers and Monitor Wells</u> - The objectives for the design and installation of the piezometers and monitor wells of the 1986 French Limited Field Investigation were two-fold:

1. Design a program of wells to add geologic data between the surface and the Deep Aquifer in and about the French Limited Site;

2. Design and construct a series of shallow wells and piezometers to test the ability of a given clay layer (-67 to -80 MSL) to act as an aquitard beneath the French Limited Lagoon. See Plate 1, field investigation map, in Attachment 1 for the location of all monitor well and piezometers.

5.4.1 <u>Deep Aquifer Monitor Well Installation</u> - The Deep Aquifer monitor well installation program consisted of adding three monitor wells (REI 10-1, REI-11, and REI 12-1) to



JET PUMP AT SURFACE

TOP OF SCREEN 190 FT. BELOW GRADE
BOTTOM OF SCREEN 200 FT. BELOW GRADE

SLOT SIZE UNKNOWN

WELL REMOVED FROM SERVICE 07/07/86

CASING PULLED, 8 INCH BORE OVER-REAMED TO 205 FT., BORE PRESSURE GROUTED THROUGH RODS

▼ WATER LEVEL TAKEN 05/28/86

VERTICAL SCALE : 1"=30'

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FIGURE 5-1

MURPHY WELL CONSTRUCTION

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the four monitor wells which existed at the start of the 1986 Field Investigation (GW-12, GW-25, REI 3-4, REI 7). The locations of these new wells were selected to provide information for potentiometric maps and to provide optimal spacing distances for the pumping tests performed during the investigation.

Each monitor well bore was advanced with a mud rotary drilling rig, using bentonite powder and potable water as a drilling mud. Monitor wells and piezometers in the REI 10 cluster (see Figure 5-2 for location) required the addition of coarse mica as a fluid circulation loss additive, due the head generated by the French Limited lagoon and the coarseness of the material encountered while drilling. An eight (8) inch surface casing was pushed to the first significant clay layer and grouted in place. The drilling fluid from the upper formations was pumped into 55 gallon drums for return to the French Limited Lagoon, prior to advancing a smaller diameter hole for installation of the monitor well. Each monitor well was constructed of four (4) inch flush jointed schedule 40 Triloc PVC blank and 0.010-inch Triloc PVC screen. Each screen length was custom cut in the field, so only the discrete permeable zone was screened.

5.4.2 <u>Shallow Aquifer Monitor Wells and Piezometer Installation</u> - The REI 10 cluster of monitor wells and piezometers was designed to test the degree of vertical

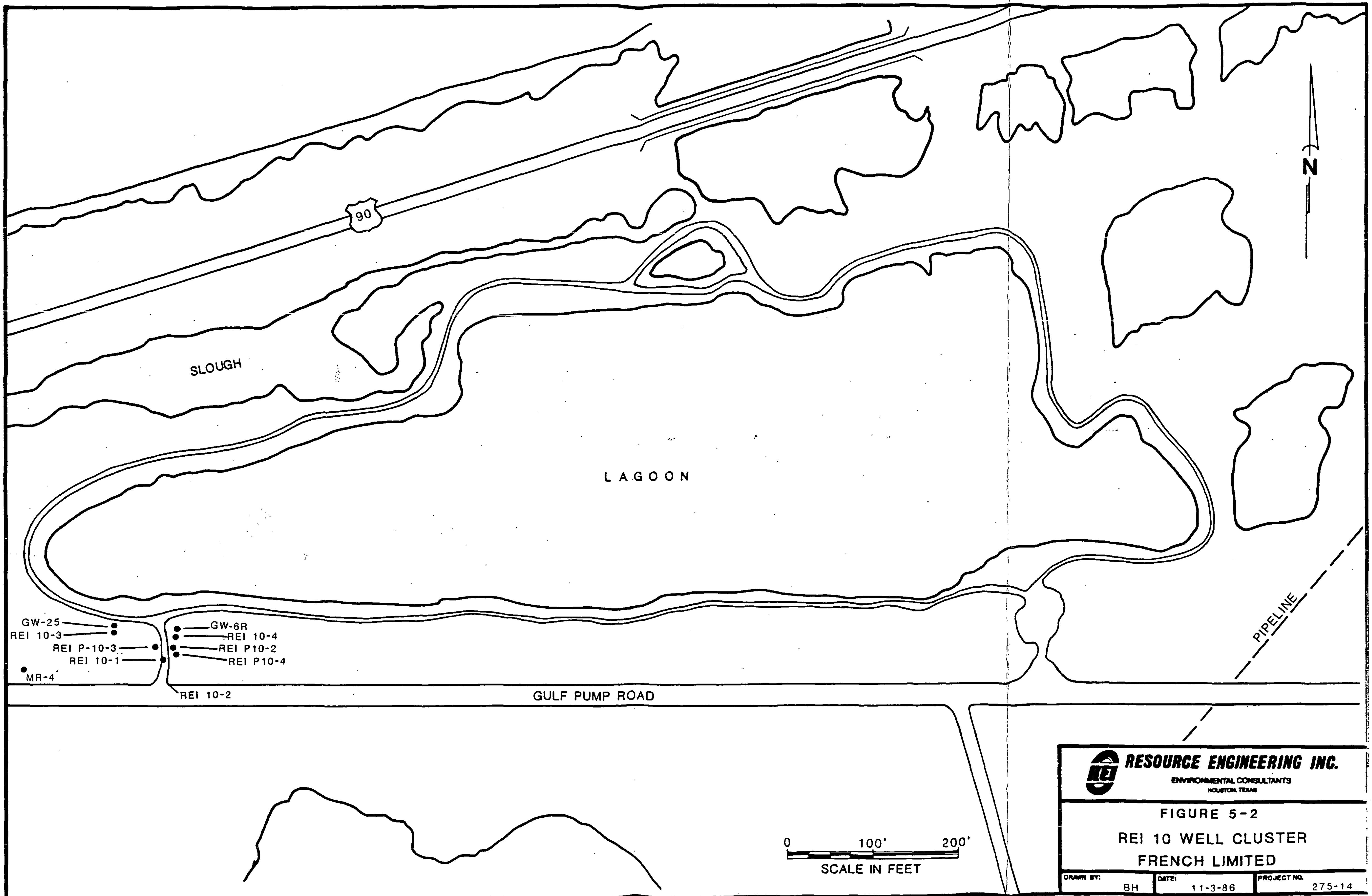

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FIGURE 5-2
REI 10 WELL CLUSTER
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hydraulic connection between the zone of French Limited alluvium and the Deep Aquifer. Three shallow monitor wells (REI 10-2, REI 10-3, and REI 10-4) were placed near REI 10-1 in the third shallow sand zone below the surface, resting on the first significant clay (approximately -34 feet MSL). Each monitor well was constructed of four (4) inch flush jointed Triloc Schedule 40 PVC, 0.010-inch slot screen and casing. Temporary 10-inch casing was used while drilling, in addition to circulation loss materials (MICA), to minimize excessive sloughing in the bore while drilling.

The three piezometers installed to characterize the qualities of the aquitard (REI P10-2, REI P10-3, and REI P10-4), were advanced to the first massive, low silt, clay (approximately -67 MSL). Six (6) inch flush jointed PVC surface casing was pushed to that depth and grouted in place. Drilling fluids were removed from the casing with an air compressor and the remainder of the bore (2 to 12 feet) was advanced using only potable water as a drilling fluid. Each piezometer has two (2) feet of open screen and is positioned at a different interval in the clay or in the first two(2) feet of the silt directly below the clay. Soil compaction test results from this clay interval are presented in Appendix 10. The REI-12 cluster of wells was designed to test an area north of Highway 90 for hydraulic connection between the alluvium and the Deep Aquifer. One shallow monitor well, (REI 12-2) was placed near REI 12-1 Deep Aquifer well to support this test. Installation and construction was similar to the shallow wells, as described above.

All monitor well construction logs (with the well elevation survey) and geophysical logs are presented in Appendices 12 and 13, respectively.

5.4.3 Monitor Well Development - The shallow and deep aquifer wells were developed by using a submersible pump. Conductivity, pH, and temperature readings were taken after the removal of each volume of development water until the readings stabilized. Step drawdown tests were performed on new pumping wells (REI 10-1 and REI 12-1), to estimate the pumping rate and the ability of the formation to recharge after the stress of pumping. See Appendix 23 for description of the pumping test step drawdown data that resulted from these tests.

5.4.4 Monitor Well Post-Construction Analysis - Information gathered during the design and construction of the 1986 Field Investigation Monitor Wells was integrated with data generated from previous Deep Aquifer investigations. Geophysical logs from those previous investigations are included in Appendix 13.

A cross-section diagram depicting the stratigraphy across the site is presented as Figure 5-3. This diagram is an interpretation of geophysical spontaneous potential and resistivity traces logged from bores penetrating the Deep Aquifer prior to setting a monitor well.

FIGURE 5-3
1986 FIELD INVESTIGATION
GENERALIZED STRATIGRAPHIC
CROSS SECTION D-D'
FRENCH LIMITED

Common procedure, field equipment, installation details, measuring methods, and other activities are described as follows:

5.5.1 Pretest Activities - The pumping tests were performed utilizing newly installed monitor wells, in addition to wells installed during previous investigations. These new wells were developed using a submersible, electric-driven pump following procedures described in the French Limited Site Investigation Report of June, 1986.

The flow rate to be used during each pumping test was selected based on review of drawdown test data, preliminary pumping test data; or data from the 1985 Field Investigation. The selected flow rate was picked to provide balance among the various test objectives. These objectives consisted of 1) maintaining a constant flow rate throughout the test; 2) avoiding "cavitation" or breaking suction" on the pump; and 3) maximizing hydraulic "stress" on the aquitard during the available test duration. Proper balancing of these factors supported achievement of the test objectives to evaluate potential connection between the Shallow Alluvial zone and the Deep Aquifer, and to obtain data for calculation of Deep Aquifer characteristics. Pumping flow rate information from previous investigations was also used in making the test flow rate decision.

Pumps were installed by REI personnel, or by subcontractors supervised by REI. The pump installation was designed to minimize addition of artifactual constituents to the wells. Dedicated hoses and polypropylene rope were secured together with nylon ties for the REI 3-4 cluster test pump. The large volume pump necessary for the REI 10 cluster test was installed, and suspended on 2-inch PVC pipe. New disposable PVC gloves were used to handle the equipment while lowering pumps into the wells. A flow meter was installed in the pump discharge piping, after each pump installation.

An In-Situ, Inc. Hydrologic Analysis System-Model SE-200 computer was utilized to monitor and record the water levels in observation wells during the tests. This system is a fully automated data acquisition system that utilizes pressure transducers as the water level detection devices. A detailed description of the In-Situ SE-200 computer system and the pressure tranducers is provided in the In-Situ Operating Manual Information shown in Appendix 15. Each In-Situ pressure transducer was installed after first measuring the depth to static water level from the well's casing datum. This measurement was made to the nearest 0.01 feet, and documented with the well number in the field logbook, together with the transducer's serial number, scale factor, and range. The transducer was lowered into the well while measuring its cable length, again to the nearest 0.01 feet. The 50 pounds per square inch gauge (PSIG) range transducers used on the Deep Aquifer wells were installed from 40 to 50 feet below static water surface, as measured from the well datum. The 10 PSIG range transducers utilized on the shallow Alluvial zone wells were installed 10 to 12 feet below static water surface, as measured from the well datum. The transducer cable was secured to the well casing using tape, and its final installed depth recorded in the field logbook.

The well opening was covered to prevent entrance of precipitation. The transducer cable was color coded to ensure proper well identification, and routed to the In-Situ SE-200 computer for connection to the selected data recording channel. The transducer installed in a pumping well was suspended inside a 3/4-inch PVC pipe, which in turn was suspended in the well to minimize turbulence effects on the measurement. The transducer for wells having potential water contamination was placed in 3/4-inch PVC pipe; a special stainless steel connector was used to seal the transducer and its cable. This prevented well water contact with the transducer and cable, except for the transducer sensing tip, which protruded through the special connector and was coated with a Teflon/Silicone grease.

Background water level measurements from each observation well involved in the pumping test were recorded using both manual measuring methods and the In-Situ SE-200 computer. Fluctuations in these levels were monitored to document natural fluctuations in the zones observed and to determine when the water-bearing zones of interest had equilibrated after artificial disturbances caused by previous pumping tests or drilling activities. A Weather-Measure Metrograph with a 7-day reading drum graph was used to record temperature, relative humidity, and barometric pressure. This metrograph was maintained during all phases of the tests, including the background, drawdown, and recovery phases.

5.5.2 Test Execution - Upon the start of the drawdown phase of the test the flow rate was monitored constantly for the initial 2 to 3 hours. These flow rate readings were recorded every 5 to 10 minutes on the appropriate field data sheets. Adjustments were made to maintain the flow rate to within 10% of the selected test design rate. Correct flow rates were usually achieved in less than 1 minute after the start of each test. After the initial 3 hours, Flow meter readings were documented every 15 to 30 minutes through the remainder of the test.

Flow rates were maintained constant if possible, for a minimum of 12 hours after initiating the test, to maximize reliability of the data used for quantifying aquifer characteristics. After the initial 12 hours, flow rates were reduced to prevent pump cavitation due to breakage of pump suction in the pumping well, if it became necessary.

During the pumping test, water levels in the wells were measured and recorded by the In-Situ SE-200 computer using its preprogrammed logarithmic data recording schedule. This schedule is:

Interval Between Measured Water Levels		Aquifer Test Elapsed Time
1 second	....	0 to 10 seconds
5 seconds	....	10 to 60 seconds
20 seconds	....	1 to 10 minutes
2 minutes	....	10 to 100 minutes
20 minutes	....	100 to 1000 minutes
60 minutes	....	1000 to 10000 minutes
200 minutes	....	10000 to 99999 minutes

The computer also provides an option for collecting data at shorter intervals for one well. The computer was programmed to designate the pumping well for this special treatment option in all of the tests.

Manual water level measurements taken and recorded periodically throughout the test provided a quality assurance cross-check of the quality of data recorded by the computer system. A Well Wizard Series 6000 well sounder was used to collect the manual measurements. This instruments inherent design accuracy is to 0.01 feet.

As the pumping test progressed, the various test data were monitored and evaluated for conditions which would require adjustments in test conditions or procedure. The data that were monitored included comparision of the manual water level measurement with the computer data, and computer-plotted well level drawdown curves.

The In-Situ computer data and the manual water level measurements were continued during the "Recovery" phase of the test, after the pump was shut off. The In-Situ computer program was reset to the beginning of its preprogrammed data recording schedule so that early, crucial recovery data could be recorded at a frequent interval. Water level monitoring during the recovery phase was continued until sufficient data was obtained for determination of aquifer characteristics.

5.5.3 Post-Test Activities - After completion of the recovery phase, the field test activities were concluded and the In-Situ computer removed to the office for unloading the test data tapes. The computer's data were compared to manual level readings as a quality control check to ensure its accuracy. This comparison included plotting manual measurements and computer measurements on log-log and semi-log paper to determine if the resulting response curves indicated significant differences. When significant variances were noted, records were studied for indications of equipment failure, and measurement or transcription error. To minimize transcription errors, data tapes from the In-Situ SE-200 computer were loaded directly into a Lotus spreadsheet PC program to perform the repetitive calculations efficiently and accurately.

The required range of aquifer characteristic values was calculated using several methods and, after all graphical methods and calculations had been completed, they were checked for accuracy by a second person.

The data were then hand plotted on both log-log and semi-log Keuffel and Esser (K+E) graph paper for analysis. Due to the voluminous nature of the data generated, it was practical for only certain data to be plotted. The plots were then checked for accuracy.

The two methods of analysis for the drawdown data were the Theis non-equilibrium solution (Theis, 1935; Heath and Trainer, 1981) and the time vs. drawdown modification to Theis' non-equilibrium solution by Cooper and Jacob (Driscoll, 1981). The recovery data were also analyzed by both of these methods, using the assumption of Theis' Correlary, and the residual drawdown plot solution (after Driscoll). For the log-log plots, the resulting curves were matched using a reverse type curve provided in the U.S. Department of Interior: Ground Water Manual, A Water Resources Technical Publication, 1981; (Figure 5-5). This type curve was used instead of a leaky type curve (e.g., after Walton, Theis) because most of the curves generated from the data were non-leaky. Only that portion of the curve plot considered to be applicable was utilized in the hydrogeologist's interpretation of where curves matched the type curve.

Similarly, for the semi-log plots, only the representative data were utilized to identify a straight-line intersect from each plot. In some cases, two intersects were identified and also considered to provide a range for variation.

Aquifer characteristics were calculated, using the data obtained from the plots. The formulas used are specifically cited by each solution method employed. Some additiional data, are necessary within the calculations, such as flow rate (Q) were taken from the pumping test results. Where necessary, adjusted values were used, as indicated, to compensate for some of the uncontrollable events that occurred during the tests.

The saturated thickness of the aquifer (b) was determined, using the screen length of each observation well for consistency.

Results from calculations for transmissivity and hydraulic conductivity were expressed in both English Standard Units and SI-Metric Units, for convenience.

5.6. REI 3-4 Run #1 Pumping Test

5.6.1 Purpose - The major objective of this test was to qualitatively evaluate the potential hydraulic connection of the Alluvial Zone and the Deep Aquifer. These test results would also be compared with the results of the more sophisticated REI-10 cluster test to evaluate the areal extent of the aquitard(s).

Aquifer characteristics had been previously determined at this location in a pumping test which was described in the French Limited Remedial Investigation Report June 1986. As indicated in the 1986 Field Investigation Work Plan, aquifer characteristics (transmissivity, storativity, and hydraulic conductivity) of the Deep Aquifer would be redetermined from data collected during this test.

5.6.2 Description of Test - The test's operational parameters and well construction information are described in Table 5-1. Further installation and construction details for REI 10-1 and REI 11 are described in Section 5.4. Details of REI 3-4, REI 7, REI 3-1, REI 3-2 and REI 3-3 installation and construction are described in the Remedial Investigation Report June 1986 for the French Limited Site.

Monitor Wells REI 3-1, REI 3-2, and REI 3-3 are located at small radial distances from REI 3-4 in conformance with the Neuman-Witherspoon field test requirements. Water levels were observed in these three wells for possible responses to the drawdown of the Deep Aquifer. The remaining observation wells (REI 11, REI 7, REI 10-1) and REI 3-4 were monitored for data used in determining aquifer characteristics.

5.6.3 Results - The 2.5 gpm test flow rate used at the start of the test was selected based on information from the 1985 pumping test, and it was intentionally set at a high rate based on a desire to maximize "stress" on the aquitard in

TABLE 5-1

REI 3-4 RUN #1 PUMPING TEST PARAMETERS

DURATION OF PUMPING: From 8-20-86 @ 21:00 to 8-21-86 @ 03:00 (360 min.)

DURATION OF RECOVERY: From 8-21-86 @ 03:00 to 8-21-86 @ 16:20 (810 min.)

	COMMENTS
PUMPING WELL: REI 3-4	REI 3-4 is screened 25 ft across the Deep Aquifer. The top of screen is located approx. 120 ft below the surface.
PUMP INTAKE LOCATION:	130 ft (approx.) below the surface.
OBSERVATION WELLS:	
REI 3-4	Screened 25 ft across the Deep Aquifer (RADIUS = 0.16 ft).
REI 7	Screened 15 ft across the Deep Aquifer (RADIUS = 682.67 ft).
REI 10-1	Screened 25.3 ft across the Deep Aquifer (RADIUS = 784.360 ft).
REI 11	Screened 16.58 across the Deep Aquifer (RADIUS = 446.391 ft).
REI 3-3	Screened 14 ft across the Alluvial Aquifer.
REI 3-2	Screened 5 ft across a shallow water-bearing zone, below REI 3-3.
REI 3-1	Screened 10 ft across a shallow water-bearing zone, below 3-2.

FLOW RATE DATA SUMMARY

Flow Rate (gpm)	From	To	Comments
2.5	8-20-86 @21:00	8-20-86 @21:21	Designated pumping rate.
2.1-1.65	8-20-86 @21:00	8-20-86 @03:07	Steady decrease in pumping rate because of decline in head.
0	8-21-86 @03:07		Recovery phase started because flow rate would have caused pump to break suction.

Pumping Rate Monitoring: Dwyer Series VFC Visifloat Flowmeter (range = 0.6 to 6.0 gpm, accuracy ± 0.005.

the available pumping test duration. However, this high flow rate could not be maintained constant throughout the test because: 1) the flow rate caused sufficient drawdown to limit the pumping capacity, and 2) the flow rate exceeded the specific capacity of the well. This would have caused the pump to break suction prior to test completion, if the flow rate had not been reduced. Discussion on terminating this test began within 20 minutes after it began, and it was actually terminated after approximately 360 minutes of drawdown. Data from this test were not evaluated for the potential connection of the zones nor for aquifer characteristics.

5.7 <u>REI 3-4 Run #2 Pumping Test</u>

5.7.1 <u>Purpose</u>. The purpose of this test was the same as that described for Run #1, in Section 5.6.1.

5.7.2 <u>Description of Test</u> - The test's operating parameters and well construction information are described in Table 5-2. The same observation wells monitored during REI 3-4 Test Run #1 were also monitored in this test. (See Section 5.6.2.) The REI 3-4 Run #2 Test was started using a 1.6 gpm flow rate which was maintained constant for approximately 28.5 hours. At that time, it became necessary to adjust the flow to 1.4 gpm to prevent the pump from breaking suction. This 1.4 gpm flow rate was maintained for the remainder of the test.

TABLE 5-2

REI 3-4 RUN #2 PUMPING TEST PARAMETER

DURATION OF PUMPING: From 8-21-86 @ 16:30 to 8-24-86 @ 17:00 (4349.7 min.)

DURATION OF RECOVERY: From 8-24-86 @ 17:00 to 8-25-86 @ 08:54 (954.580 min.)

	COMMENTS
PUMPING WELL: REI 3-4	REI 3-4 is screened 25 ft across the Deep Aquifer. The top of screen is located approx. 120 ft below the surface.
PUMP INTAKE LOCATION:	130 ft (approx.) below the surface.
OBSERVATION WELLS:	
REI 3-4	Screened 25 ft across the Deep Aquifer (RADIUS = 0.16 ft).
REI 7	Screened 15 ft across the Deep Aquifer (RADIUS = 682.67 ft).
REI 10-1	Screened 25.3 ft across the Deep Aquifer (RADIUS = 784.360 ft).
REI 11	Screened 16.58 across the Deep Aquifer (RADIUS = 446.391 ft).
REI 3-3	Screened 14 ft across the Alluvial Aquifer.
REI 3-2	Screened 5 ft across a shallow water-bearing zone, below REI 3-3.
REI 3-1	Screened 10 ft across a shallow water-bearing zone, below 3-2.

FLOW RATE DATA SUMMARY

Flow Rate (gpm)	From	To	Comments
1.6	8-21-86 @16:30	8-22-86 @21:11	Designated pumping rate. Rate remains within 10% of 1.6 gpm.
1.1-1.9	8-22-86 @21:11	8-22-86 @21:15	Flow oscilated widely due to imminent breakage of suction in the pumping well.
1.4	8-22-86 @21:15	8-24-86 @17:00	Flow stabilized. Rate remained within 10% of 1.4 gpm. The rate was increased to 1.45 between 8-24-86 @07:30 and 8-24-86 @12:19.
0	8-24-86 17:00		Recovery phase started based on study of drawdown curves.

Pumping Rate Monitoring: Dwyer Series VFC Visifloat Flowmeter (range = 0.6 to 6.0 gpm, accuracy ± 0.005.

5.7.3 Results. The level measurement data from the In-Situ SE-200 Computer were processed into calculation data sheets for the test, which are provided in Appendix 16. The drawdown and recovery curves and aquifer characteristics calculations are shown in Attachment 5.

A. Connection Evaluation - No drawdown reaction was observed in REI 3-1, REI 3-2, or REI 3-3, during the 3 day duration of the test, which could be attributed to drawdown of the Deep Aquifer. Assessment of the fluctuations observed in these three wells during the test indicates they were affected by several factors: atmospheric pressure changes, precipitation, and earth tides. (See discussion of earth tides in Section 5-10.3). Tidal effects seem to have been the dominant cause of the fluctuations observed in REI 3-1, REI 3-2 and REI 3-3; however, these effects appear to have been retarded and sometimes overidden by precipitation events. In one incident, after a major rainfall event had begun, the water levels in all three wells were observed to rise signficantly. This recharge response initially occurred in the shallowest well, REI 3-3, then in REI 3-2 (deeper than REI 3-3), and then in REI 3-1, the deepest. The observed lag time is probably a function of the difference in the well depths. The relatively rapid responses of all three wells indicate that the three zones are in weak hydraulic communication. The surface water pond adjacent to the REI 3 cluster is the probable source for both the recharge and intercommunication between the zones monitored by REI 3-1, REI 3-2 and REI 3-3.

B. Aquifer Characterization - The hydrologic characteristics of the aquifer were derived from analysis of the data collected from four observation wells. The values for the hydrologic characteristics were calculated using methods described in Section 5.5.3. A summary of the results of those calculations is presented in Table 5-3. Transmissivity and storativity were calculated from the drawdown data using the 1.6 gpm flow rate that was maintained during the first 28.5 hours of the tests drawdown period. An adjusted flow rate of 1.4 gpm was maintained for the last 44 hours of the test. In the recovery data calculations, the adjusted flow rate, Q_r = 1.4 gpm was used to determine transmissivity and storativity.

1. Transmissivity - The transmissivity of the Deep Aquifer was determined to range from 9.17×10^0 gpd/ft (1.32×10^{-6} m^2/sec) to 8.89×10^2 gpd/ft (1.28 x 10-4 m^2/sec) based on the most representative data. (See the discussion in Section 5.10.3 for further details). This relatively large range (almost three orders of magnitude) indicates that the Deep Aquifer may not be homogenous. The variations in grain size and thickness documented in the boring log data (see Appendix 12) also support this conclusion. The transmissivity values appear to increase areally from REI 3-4 toward REI 11 and REI 10-1 (north). The difference between the values of the latter two observation wells is relatively small.

TABLE 5-3

REI 3-4 RUN #2 PUMPING TEST

HYDROGEOLOGIC CHARACTERISTICS SUMMARY

Observation Well	Analysis Method	Transmissivity (T) gpd/ft	Transmissivity (T) m^2/sec	Storativity (S)	Hydraulic Conductivity (K) gpd/ft^2	Hydraulic Conductivity (K) cm/sec
REI 3-4						
Drawdown	Log-Log	1.41×10^{1}	2.03×10^{-6}	3.77×10^{-1}	6.13×10^{-1}	2.89×10^{-5}
	Semi-log	1.53×10^{1}	2.20×10^{-6}	2.83×10^{-1}	6.65×10^{-1}	3.14×10^{-5}
Recovery	Log-Log	9.17×10^{0}	1.32×10^{-6}	-	3.99×10^{-1}	1.88×10^{-5}
	Semi-log[a]	9.91×10^{0}	1.42×10^{-6}	-	4.31×10^{-1}	2.03×10^{-5}
	Semi-log[b]	1.01×10^{1}	1.45×10^{-6}	-	-	-
REI-11						
Drawdown	Log-Log	8.82×10^{2}	1.27×10^{-4}	1.11×10^{-4}	5.36×10^{1}	2.53×10^{-3}
	Semi-log	7.94×10^{2}	1.14×10^{-4}	8.71×10^{-5}	4.83×10^{1}	2.28×10^{-3}
		8.89×10^{2}	1.28×10^{-4}	9.76×10^{-5}	5.41×10^{1}	2.55×10^{-3}
Recovery	Log-Log	6.17×10^{2}	8.87×10^{-5}	-	3.75×10^{1}	1.77×10^{-3}
	Semi-log[a]	6.43×10^{2}	9.24×10^{-5}	-	3.91×10^{1}	1.84×10^{-3}
	Semi-log[b]	7.01×10^{2}	1.01×10^{-4}	-	-	-
REI 7						
Drawdown	Log-Log	-	-	-	-	-
	Semi-log	1.97×10^{3}	2.84×10^{-4}	6.07×10^{-4}	1.32×10^{2}	6.20×10^{-3}
Recovery	Log-Log	*	*	-	*	*
	Semi-log[a]	2.40×10^{3}	3.45×10^{-4}	-	1.60×10^{2}	7.54×10^{-3}
	Semi-log[b]	2.78×10^{3}	4.00×10^{-4}	-	-	-
REI 10-1	Log-Log	-	-	-	-	-
Drawdown	Semi-Log	9.89×10^{2}	1.42×10^{-4}	4.69×10^{-5}	3.91×10^{1}	1.84×10^{-3}
		1.06×10^{3}	1.52×10^{-4}	8.06×10^{-5}	4.17×10^{1}	1.97×10^{-3}
Recovery	Log-Log	5.63×10^{2}	8.10×10^{-5}	-	2.23×10^{1}	1.05×10^{-3}
	Semi-log[a]	6.35×10^{2}	9.13×10^{-5}	-	2.51×10^{1}	1.18×10^{-3}
	Semi-log[b]	6.59×10^{2}	9.47×10^{-5}	-	-	-

* Could Not Determine a - residual drawdown vs. t/t' b - residual recovery vs. time

2. Storativity - Storativity values ranged from 8.71×10^{-5} to 3.77×10^{-1}. Confined aquifers generally exhibit low storativities in a range from 1×10^{-5} to 1×10^{-3}. (Driscoll, 1986). The relatively high storativity value obtained from REI 3-4 may be due to a transition in the geologic characteristics (e.g., grain size, thickness).

3. Hydraulic Conductivity - The values for hydraulic conductivity ranged from 3.99×10^{-1} gpd/ft^2 (2.89×10^{-5} cm/sec) to 5.4×10^{1} gpd/ft^2 (2.55×10^{-3} cm/sec). These values represent an average hydraulic conductivity; the Deep Aquifer, as identified by boring log data, is stratified (non-homogeneous). Comparisons with the charts (Attachment 5) provided by both Driscoll (1986) and the U.S. Department of Interior: Ground Water Manual (1981) show that this range compares with the hydraulic conductivities of a silt or sandy silt to a well-sorted, medium-grained sand.

C. Boundary Conditions - An evaluation of the observation well data and the drawdown and recovery curve plots indicates boundary conditions were observed. At first glance, the log-log curve plots of REI 3-4 appear to be representative of a leaky confined aquifer. The log-log and semi-log plots of the other observation wells, however, seem to indicate the Deep Aquifer is non-leaky and is almost an "ideal aquifer." A more plausible explanation for these apparent inconsistencies is that REI 3-4 may be located very close to where the Deep Aquifer decreases significantly in either lateral extent, or thickness, and/or experiences changes in grain size (i.e., located within an area of low transmissivity). Support for this explanation is provided by the differences in the transmissivity values calculated for REI 3-4 as compared to the values for the other observation wells (Table 5-3). The REI 3-4 values are two orders of magnitude lower than the values obtained from REI-11 and REI 10-1. (Additional information obtained in subsequent tests provided further supporting evidence that the Deep Aquifer is bounded.)

Thus, apparent leaky conditions observed in REI 3-4 may have been caused by the influence of a diverse aquifer which exhibits much higher transmissivities at other nearby locations and resulting in the observation of an apparent recharge boundary (Freeze and Cherry, 1979).

5.8 <u>REI 10-1 Run #1 Pumping Test</u>

5.8.1 <u>Purpose</u> - The major objective of this test was to qualitatively evaluate the potential hydraulic connection between the Alluvial zone and the Deep Aquifer. In addition, characteristics of the Deep Aquifer (transmissivity, storativity, and hydraulic conductivity) would be determined from this test. Characteristics of the aquitard would also be determined, using the field method described in Neuman and Witherspoon (1972) as shown in Appendix 17, if drawdown responses were observed in the piezometers installed in the aquitard.

5.8.2 <u>Description of Test</u> - The test's operational parameters and well construction information are described in Table 5-4. Additional installation and constuction details for REI 10-1, REI 11, REI 12-1, REI 10-2, REI 10-3, REI 10-4, P10-2, P10-3 and P10-4 are described in Subsection 5.4. The installation and construction details for GW-25, REI-7 and REI 3-4 are described in the Remedial Investigation Report June, 1986 for the French Limited Site. The new REI 10 cluster wells and piezometers were located to conform with the Neuman-Witherspoon field test requirements, i.e., at as small radial distances from the pumping well (REI 10-1) as practically possible.

A premise of the test design was that piezometers P10-2, P10-3 and P10-4 would measure any response through the aquitard, to drawdown in the Deep Aquifer, if indeed, the aquitard were leaky. REI 10-2, REI 10-3, and REI 10-4 were monitored for possible response in the Alluvial Zone, to drawdown of the Deep Aquifer during the test. The remaining observation wells (REI-11, REI-7, REI 3-4, REI 12-1) and the pumping well were monitored to obtain data for determining aquifer characteristics.

The initially selected flow rate for this test (20 gpm), which was maintained for the first 12 hours of the drawdown phase had to be adjusted. At approximately 11 hours of elapsed time, an increase in drawdown rate was observed in

TABLE 5-4

REI 10-1 RUN #1 PUMPING TEST PARAMETERS

DURATION OF PUMPING: From 9-15-86 @ 13:00 to 9-6-86 @ 16:30 (1650.6 min.)

DURATION OF RECOVERY: From 9-16-86 @ 16:30 to 9-19-86 @ 07:37 (3786.6 min.)

PUMPING WELL: REI 10-1	REI-10 is screened 25.3 ft across the Deep Aquifer. The top of screen is located approx. 122.5 ft below the surface.
PUMP INTAKE LOCATION:	138 ft (approx.) below the surface.
OBSERVATION WELLS:	
REI 10-1	Screened 25 ft across the Deep Aquifer (RADIUS = 0.16 ft).
REI 7	Screened 15 ft across the Deep Aquifer (RADIUS = 1012.704 ft).
REI 11	Screened 16.58 ft across the Deep Aquifer (RADIUS = 427.782 ft).
REI 3-4	Screened 25 ft across the Deep Aquifer (RADIUS = 784.360 ft).
GW-25	Screened 5 ft across the deep Aquifer (RADIUS = 66.670 ft).
REI 12-1	Screened 36.5 ft across the Deep Aquifer (RADIUS = 1492.112 ft).
P10-2	Screened 2.01 ft across an intermediate silt (RADIUS = 20.845 ft).
P10-3	Screened 2.00 ft across an intermediate clay (RADIUS = 20.220 ft).
P10-4	Screened 2.00 ft across an intermediate clay (RADIUS = 20.053 ft).
REI 10-2	Screened 13.75 ft across the Alluvial Zone.
REI 10-3	Screened 10.30 ft across the Alluvial Zone.
REI 10-4	Screened 12.80 ft across the Alluvial Zone.

FLOW RATE DATA SUMMARY

Flow Rate (gpm)	From	To	Comments
19-20.3	9-15-86 @13:00	9-16-86 @03:00	Designated pumping rate was 20 gpm, it remained within 10% of 20 gpm.
19-14.5	9-16-86 @03:00	9-16-86 @10:43	Flow was steadily decreased so that drawdown in the pumping well would not exceed 50 ft.
12.0	9-16-86 @10:43	9-16-86 @13:02	Flow was hed steady at 12 gpm.
12.0-14.7	9-16-86 @13:02	9-16-86 @16:30	Flow was steadily increased in an attempt to again reach 50 ft of drawdwown in the pumping well.
0	9-16-86 @16:30		Recovery phase started.

Pumping Rate Monitoring: Hydril TMTR 500 digital orifice flow meter.

the pumping well. It later became apparent that, if this increase continued, the drawdown in the well would pass below the top of the screen, causing cavitation. The flow rate was adjusted periodically in order to maintain the drawdown at a safe level above the screened interval. This test was terminated after only 27.5 hours of drawdown due to the observation of an anomoly in the response of REI 10-3.

5.8.3 <u>Results</u> - The level measurement data from the In-Situ SE-200 computer were processed into calculation data sheets for the test; these are provided in Appendix 18. The drawdown and recovery response curve plots, and aquifer characteristics calculations are shown in Attachment 6.

A. <u>Connection Evaluation</u> - Anomolous water level fluctuations were observed in REI 10-3 during this test. After 3.5 hours of elapsed time, the transducer measurements indicate that REI 10-3 was experiencing drawdown. REI 10-2, REI 10-3, and REI 10-4 are located within close proximity of each other and are screened in the same zone; thus, water level fluctuations of all three wells were expected to be similar.

In comparison, with the possible exception of a disturbance observed in the initial 10 minutes of the test, REI 10-2 and REI 10-4 fluctuated synchroneously from other influences, not associated with the anomaly.

The piezometers P10-3 and P10-4, which are both screened in the clay aquitard, exhibited minor fluctuations within a 0.03 feet range. The water levels in

P10-2, however, rose 0.10 feet, in the initial 10 minutes of the test, and then began to respond somewhat erratically. (The initial rise may have been caused by the phenonomenum known as the Noordbergum effect. See Subsection 5.9.3 for a detailed description of this effect.) An assessment of the fluctuations in REI 10-3 and P10-2 and those in the other observation wells was made while this test was in progress.

After reviewing the data, and deliberating over potential causes and sources for the anomaly, it was postulated that leakage around an artificial penetration, located near REI 10-3, was the probable cause for both the anomaly and the erratic fluctuations observed in P10-2. The potential for connection between the shallow Alluvial zone and the Deep Aquifer by leakage through the aquitard was ruled out because of: 1) the relatively rapid responses of REI 10-3 and P10-2; and 2) the lack of drawdown response in either P10-3 and P10-4. This test was terminated after 27.5 hours of drawdown. An additional drawdown test was conducted, after partial recovery of the Deep Aquifer, to determine whether the observed anomaly could be repeated. Results of this test, which lasted for approximately 3.5 hours, were, however, inconclusive. (See Appendix 24)

B. <u>Aquifer Characterization</u> - The hydrologic characteristics of the aquifer were derived from an analysis of data collected from six observation wells. The values for the hydrologic characterics are presented in Table 5-5. The

TABLE 5-5

REI 10-1 RUN #1 PUMPING TEST

HYDROLOGIC CHARACTERISTICS SUMMARY

Observation Well	Analysis Method	Transmissivity (T) gpd/ft	Transmissivity (T) m^2/sec	Storativity (S)	Hydraulic Conductivity (K) gpd/ft^2	Hydraulic Conductivity (K) cm/sec
REI 10-1						
Drawdown	Log-Log	9.55×10^{2}	1.37×10^{-4}	1.24×10^{-4}	3.77×10^{1}	1.78×10^{-3}
	Semi-log	1.08×10^{3}	1.55×10^{-4}	1.92×10^{-4}	4.26×10^{1}	2.01×10^{-3}
GW-25						
Drawdown	Log-Log	1.57×10^{3}	2.26×10^{-4}	2.10×10^{-4}	3.14×10^{2}	1.48×10^{-2}
	Semi-log	1.77×10^{3}	2.55×10^{-4}	2.08×10^{-4}	3.54×10^{2}	1.67×10^{-2}
		6.14×10^{2}	8.83×10^{-5}	2.01×10^{-3}	1.23×10^{2}	5.79×10^{-3}
REI 11						
Drawdown	Log-Log	2.05×10^{3}	2.94×10^{-4}	1.44×10^{-4}	1.24×10^{2}	5.87×10^{-3}
	Semi-log	1.53×10^{3}	2.20×10^{-4}	8.65×10^{-5}	9.30×10^{1}	4.39×10^{-3}
		7.03×10^{2}	1.01×10^{-4}	1.34×10^{-4}	4.27×10^{1}	2.02×10^{-3}
REI 3-4						
Drawdown	Log-Log	9.67×10^{2}	1.39×10^{-4}	6.72×10^{-5}	4.20×10^{1}	1.98×10^{-3}
	Semi-log	8.12×10^{2}	1.17×10^{-4}	5.27×10^{-5}	3.53×10^{1}	1.67×10^{-3}
REI 7						
Drawdown	Log-Log	1.28×10^{3}	1.84×10^{-4}	5.96×10^{-4}	8.54×10^{1}	4.02×10^{-3}
	Semi-log	2.36×10^{3}	3.39×10^{-4}	3.71×10^{-4}	1.57×10^{2}	7.41×10^{-3}
REI 12-1	Log-Log	3.07×10^{2}	4.41×10^{-5}	4.27×10^{-5}	8.35×10^{0}	3.94×10^{-4}
Drawdown	Semi-Log	7.00×10^{2}	1.01×10^{-4}	3.60×10^{-5}	1.91×10^{1}	8.98×10^{-4}

calculations for transmissivity and storativity values were made using a 20.0 gpm flow rate. This flow rate was maintained constant for the first 12.5 hours of the test. The initial flow rate was maintained within 10 percent of the 20.0 gpm rate, until it was gradually decreased, to 18.0 gpm. A $\pm$ 10 percent fluctuation tolerance is considered acceptable to obtain accurate hydrologic characteristics (Stallman, 1983). For this reason, only the early portion of the data from the log-log plots and the semi-log plots were considered to be reliable and useable in the analysis. Recovery data were not analyzed because of the variable flow rate during drawdown.

1. Transmissivity - The transmissivity of the Deep Aquifer was determined to range from 7.03×10^2 gpd/ft (1.01×10^{-4} m^2/sec) to 2.05×10^3 gpd/ft (2.94×10^{-4} m^2/sec), based on the most reliable data (from REI-11 and REI 10-1). Transmissivities in this range are characteristic of aquifers with a fair to good potential use as a source for domestic well supplies, but a poor potential for usages requiring large volumes, such as irrigation; this is based on a comparison with the table in Attachment 7. See U.S. Dept of Interior, Ground Water Manual, 1981.

2. Storativity - Storativity values ranged from 8.65×10^{-5} to 1.24×10^{-4}. The values obtained from GW-25, REI 3-4, REI 7 and REI 12 are not considered to be reliable. (See Subsection 5.9.3.)

3. Hydraulic Conductivity - The hydraulic conductivites ranged from 3.77 x 10^1 gpd/ft^2 (1.78 x 10^{-3} cm/sec) to 1.24 x 10^2 gpd/ft^2 (5.87 x 10^{-3} cm/sec.). These values represent an average hydraulic conductivity; the Deep Aquifer, as identified by boring log data, is stratified (nonhomogeneous). Comparisons with the charts (See Attachment 8) provided by both Driscoll (1986) and the U.S. Department of Interior Ground Water Manual (1981) show that this range is comparative to the hydraulic conductivity of a well-sorted, medium-grained sand.

C. Boundary Conditions - An evaluation was not conducted on the boundary conditions observed in this test. Flow rates were variable after 12 hours of elapsed time, so the data collected after that time cannot be considered reliable. These are the data necessary to make accurate interpretations of boundary conditions.

5.9 REI 10-1 Run #2 Test

5.9.1 Purpose - The objective of this test was the same as that described REI 10-1 for Run #1, in Subsection 5.8.1

5.9.2 Description of Test. The tests operational parameters and well construction information are described in Table 5-6. Additional installation and construction details for REI 10-1, REI 11, REI 12-1, REI 10-2, REI 10-3, REI 10-4, P10-2, P10-3 and P10-4 are described in Subsection 5-4. The installation and construction details for REI-7 and REI 3-4 are

TABLE 5-6

REI 10-1 RUN #2 PUMPING TEST PARAMETERS

DURATION OF PUMPING: From 10-7-86 @ 09:00 to 10-14-86 @ 11:00
(10210.6 min.)

DURATION OF RECOVERY: From 10-14-86 @ 11:10 to 10-17-86 @ 11:04
(4314.8 min.)

PUMPING WELL: REI 10-1	REI 10-1 is screened 25.3 ft across the Deep Aquifer. The top of screen is located approx. 122.5 ft below the surface.
PUMP INTAKE LOCATION:	138 ft (approx.) below the surface.
OBSERVATION WELLS:	
REI 10-1	Screened 25 ft across the Deep Aquifer (RADIUS = 0.16 ft).
REI 7	Screened 15 ft across the Deep Aquifer (RADIUS = 1012.704 ft).
REI 11	Screened 16.58 ft across the Deep Aquifer (RADIUS = 427.782 ft).
REI 3-4	Screened 25 across the Deep Aquifer (RADIUS = 784.360 ft).
REI 12-1	Screened 36.5 ft across the Deep Aquifer (RADIUS = 1492.112 ft).
P10-2	Screened 2.01 ft across an intermediate silt (RADIUS = 20.845 ft).
P10-3	Screened 2.00 ft across an intermediate clay (RADIUS = 20.220 ft)
P10-4	Screened 2.00 ft across an intermediate silt (RADIUS = 20.053 ft).
REI 10-2	Screened 13.75 ft across the Alluvial Aquifer.
REI 10-3	Screened 10.30 ft across the Alluvial Aquifer.
REI 10-4	Screened 12.80 ft across the Alluvial Aquifer.

FLOW RATE DATA SUMMARY

Flow Rate (gpm)	From	To	Comments
unknown	10-07-86 @09:00	10-07-86 @11:45	Flow meter was not working
17	10-07-86 @11:45	10-07-86 @18:08	Flow was measured with a 5 gallon bucket, and remained within 10% of 17 gpm..
40	10-07-86 @18:08	10-07-86 @18:09	Flow was raised for one minute in an effort to flush out the flow meter.
17	10-07-86 @18:09	10-14-86 @11:10	Flow was measured with a 5 gallon bucket, and remained within 10% of 17 gpm for the remainder of the test.
0	10-14-86 @11:10		Recovery phase started.

Pumping Rate Monitoring: Flow rate was measured at the pump discharge with a 5 gallon bucket and stop watch (accuracy = 0.2 gpm).

described in the Remedial Investigation Report of June, 1986 for the French Limited Site. GW-25 was removed from service prior to this test run, and thus was not monitored.

During this test, a malfunction in the flow meter used to monitor flow rate from the pumping well was discovered after approximately 4 hours of elapsed time. It is not known whether this malfunction occurred before the test began or sometime during the initial 4 hours of the test. A 17 gpm flow rate with $\pm$ 10 percent fluctuation was maintained, using a calibrated bucket and a stop watch for the remainder of the test.

5.9.3 Results - The level measurement data from the In-Situ SE-200 computer was processed into calculation data sheets for the test which are provided in Appendix 19. The drawdown and recovery response curves plots, and aquifer characteristics calculations are shown in Attachment 9.

A. Connection Evaluation - No significant (drawdown) reaction was observed in the alluvial wells (REI 10-2, REI 10-3, and REI 10-4) or piezometers (P10-3 and P10-4), that could be attributed to the 7 days of drawdown in the Deep Aquifer. Some nonrelated water level fluctuations were observed, however.

An assessment of the water level fluctuations, in the shallow wells REI 10-2, REI 10-3, and REI 10-4 and the piezometers P10-3 and P10-4, indicates there are probably three major influences which caused the fluctuations observed: recharge by precipitation, barometric pressure changes, and earth tides.

Recharge from precipitation events was observed in the shallow wells when water levels rose after significant rainfall events. The on-site lagoon is the probable source of hydraulic communication causing the response to precipitation in the shallow wells. Little or no responses were observed in the piezometers which could be attributed directly to the precipitation events.

Major changes in barometric pressure appear to have caused some level changes in the shallow wells. The lack of any significant response to small barometric changes can be attributed to the fact that these wells are screened in a weakly confined water-bearing zone. Piezometers P10-3 and P10-4 do not appear to have responded to any barometric pressure changes.

Earth tides appear to have been the cause for many of the fluctuations observed in the shallow wells. The Dictionary of Geologic Terms (American Geologic Institute, 1976) defines an earth tide as "the rising and falling of the surface of the solid earth in response to the same forces that produce the tides of the sea." These tides are recognizable by their semi-daily cycle (1 day = 24 hours, 20 minutes). Semi-daily cycles in water level fluctuations were observed in both the shallow wells and P10-2. These cycles were more evident in the shallow wells, perhaps because of their hydraulic connection to the nearby surface impoundment. Influences by earth tides on water level fluctuations have been described and documented in the technical literature (e.g., Theis, 1939).

The fluctuations in P10-2 water level are more complex. In the early 1 to 5 minutes of the test, a rise in the water level was observed. For the remainder of the drawdown phase, its fluctuations appear to have been influenced by similar factors affecting the other shallow wells. Then, at the end of the drawdown phase, a drop in the water level was observed when the pump was turned off. These apparent responses to the starting and stopping of the pump may be attributed to the "Noordbergum effect" (Verruijt, 1969; and Wolff, 1970). This effect is described as a response to increases in the pore pressure within finer grained sediments of strata. The strain induced by the initial pumping of an aquifer, or by the turning the pump off, is transferred across the finer grained confining strata, causing the water level of wells screened in the strata to rise. P10-3 and P10-4 may have also been influenced later in the test by this effect.

B. Aquifer Characterization - The hydrologic characteristics of the aquifer were derived from analysis of the data collected from five observation wells during the REI 10-1 Run #2 test. The resulting values for the hydrologic characteristics are shown in Table 5-7.

TABLE 5-7

REI 10-1 RUN #2 PUMPING TEST

HYDROLOGIC CHARACTERISTICS SUMMARY

Observation Well	Analysis Method	Transmissivity (T) gpd/ft	Transmissivity (T) m^2/sec	Storativity (S)	Hydraulic Conductivity (K) gpd/ft^2	Hydraulic Conductivity (K) cm/sec
REI 10-1						
Drawdown	Log-Log	1.02×10^3	1.47×10^{-4}	1.31×10^{-4}	4.03×10^1	1.90×10^{-3}
	Semi-log	*	*	*	*	*
Recovery	Log-Log	8.29×10^2	1.19×10^{-4}	-	3.28×10^1	1.54×10^{-3}
	Semi-log[a]	2.13×10^3	3.06×10^{-4}	-	8.41×10^1	3.97×10^{-3}
	Semi-log[b]	7.87×10^2	1.13×10^{-4}	-	-	-
REI-11						
Drawdown	Log-Log	1.27×10^3	1.83×10^{-4}	1.14×10^{-4}	7.72×10^1	3.64×10^{-3}
	Semi-log	8.23×10^2	1.18×10^{-4}	1.17×10^{-4}	5.01×10^1	2.36×10^{-3}
		6.34×10^2	9.12×10^{-5}	1.73×10^{-4}	3.85×10^1	1.82×10^{-3}
Recovery	Log-Log	8.51×10^2	1.22×10^{-4}	-	5.17×10^1	2.44×10^{-3}
	Semi-log[a]	7.81×10^2	1.12×10^{-4}	-	4.75×10^1	2.24×10^{-3}
	Semi-log[b]	8.00×10^2	1.15×10^{-4}	-	-	-
REI 3-4						
Drawdown	Log-Log	1.03×10^3	1.48×10^{-4}	6.44×10^{-5}	4.48×10^1	2.11×10^{-3}
		7.22×10^2	1.04×10^{-4}	6.56×10^{-5}	3.14×10^1	1.48×10^{-3}
	Semi-log	6.97×10^2	1.00×10^{-4}	6.26×10^{-5}	3.03×10^1	1.43×10^{-3}
Recovery	Log-Log	9.32×10^2	1.34×10^{-4}	-	4.05×10^1	1.91×10^{-3}
	Semi-log[a]	8.42×10^2	1.21×10^{-4}	-	3.66×10^1	1.73×10^{-3}
	Semi-log[b]	9.01×10^2	1.30×10^{-4}	-	-	-
REI 7						
Drawdown	Log-Log	1.86×10^3	2.67×10^{-4}	5.77×10^{-4}	1.24×10^2	5.85×10^{-3}
	Semi-log	1.64×10^3	2.36×10^{-4}	4.25×10^{-4}	1.09×10^2	5.16×10^{-3}
Recovery	Log-Log	1.57×10^3	2.26×10^{-4}	-	1.05×10^2	4.95×10^{-3}
	Semi-log[a]	2.40×10^3	3.45×10^{-4}	-	1.60×10^2	7.54×10^{-3}
	Semi-log[b]	2.78×10^3	4.00×10^{-4}	-	-	-
REI-12						
Drawdown	Log-Log	4.81×10^2	6.92×10^{-5}	4.45×10^{-5}	1.31×10^1	6.17×10^{-4}
	Semi-Log	4.49×10^2	6.46×10^{-5}	3.28×10^{-5}	1.22×10^1	5.76×10^{-4}
Recovery	Not analyzed					

* Could Not Determine a - residual drawdown vs. t/t' b - residual recovery vs. time

1. <u>Transmissivity</u> - The transmissivity values were calculated from the drawdown data based on the assumption that a constant 17 gpm flow rate was maintained throughout the drawdown test. See the discussion in Subsection 5.9.2. The same assumption was made for analyzing the recovery data.

Transmissivity of the Deep Aquifer was determined to range from 7.81×10^2 gpd/ft. to 2.13×10^3 gpd/ft based on the most reliable data (from REI 11 and REI 10-1) of this test.

2. <u>Storativity</u> - Storativity values ranged from 1.14×10^{-4} to 1.73×10^{-4}. The values obtained from REI 3-4, REI-7 and REI-12 are not considered to be reliable.

3. <u>Hydraulic Conductivity</u> - The values for hydraulic conductivity ranged from 3.28×10^1 gpd/ft^2 (1.55×10^{-3} cm/s) to 8.41×10^1 gpd/ft^2 (3.97×10^{-3} cm/s). These values represent an average hydraulic conductivity because the Deep Aquifer, as identified by boring log data, is stratified (nonhomogeneous). Comparisons with the charts (Attachment 8) provided by both Driscoll (1986) and the U.S. Department of Interior, <u>Ground Water Manual</u> (1981) show that this range is comparative to the hydraulic conductivity of a well-sorted, medium-grained sand.

C. Boundary Conditions - An evaluation of the observation well data and the curve plots indicate a negative boundary was observed. The log-log plots all generally yield curves that approach the "ideal aquifer" type of curve. The lithologic data in boring logs indicate that the Deep Aquifer underlying the French Limited site is stratified and consists of various grain sizes; thus, it is not ideal.

When the residual-drawdown plots (H_{res} vs. t/t') of the observation wells are extended towards the origin, all generally intercept the abscissa below the origin, where the ordinate approaches 1. This is representative of a bounded aquifer, i.e., an aquifer of limited extent (after Driscoll, 1986).

The transmissivity values determined for REI 3-4 from this test are two orders of magnitude higher than those obtained in the REI 3 cluster test (Table 5-3). This was probably caused by the apparent nearby negative boundary conditions which will yield higher than normal transmissvity values in wells located near the boundary because of excessive drawdown (Driscoll, 1986).

5.10 Conclusion from Deep Aquifer Pumping Tests

5.10.1 Connection Evaluation - The purpose of these Deep Aquifer pumping tests was to determine whether a confining layer exists between the Alluvial zone and the Deep Aquifer which hydraulically isolates these two units. A possible hydraulic connection of these two units had been postulated after trace contamination was identified in samples collected from monitor well GW-25, which was screened in the Deep Aquifer.

The 1986 Deep Aquifer pumping tests do not provide evidence to support the conclusion that the two units are hydraulically connected within the near vicinity of the French Limited site. Rather, the data support the conclusion that an aquitard (or aquitards) lies between the Alluvial zone and the Deep Aquifer, thereby isolating the two units, within the near vicinity of the French Limited site.

Evaluation of the final test data showed no drawdown responses during any of the tests in either the piezometers P10-2, P10-3, P10-4, screened in a shallow confining clay aquitard between the two units of interest or the observation wells, REI 3-1, REI 3-2, REI 3-3, REI 10-2, REI 10-3, REI 10-4, screened in the Alluvial and other shallow zones, while stressing it with Deep Aquifer drawdown. The Neuman-Witherspoon field method could not be utilized to determine the hydraulic properties (hydrologic characteristics, such as hydraulic diffusivity) of the aquitard because no drawdown responses were observed in any of the piezometers during the REI 10-1 Run #2 test.

Observation made during REI 10-1 Run #1 indicated that REI 10-3 quickly responded to the pumping of the Deep Aquifer. Similar responses were also observed, though to a lesser degree, in REI 10-2, REI 10-4, and P10-2. An evaluation of these responses postulated that an artificial penetration, located very near REI 10-3, was at least one possible source for the anomolous responses. The artificial penetration (GW-25) was drilled out and sealed with a cement-bentonite grout, after review of all pertinent data and performance of another test for the anomolous response. This test produced inclusive results. After equilibration of the aquifer, REI 10-1 Run #2 was performed; no drawdown responses were observed in either the shallow Alluvial zone wells (including REI 10-3) or the piezometers. During Run #2 water levels in REI 10-3 fluctuated similarly to REI 10-2 and REI 10-4, while during Run #1, the behavior of the fluctuations in REI 10-3 was significantly different in comparison to REI 10-2 and REI 10-4. These different results, in Run #1 and Run #2, provide additional support to the conclusion that leakage through the artificial penetration, located near REI 10-3, caused the anomaly observed.

5.10.2 <u>Aquifer Characterization</u> - A description of the Deep Aquifer hydrologic characteristics (transmissivity, storativity, hydraulic conductivity) based on the data obtained in all of the pumping test is contained in the individual results sections.

The aquifer characteristics determined from some of the observation wells may not be reliable or representive of the aquifer. Some of the values determined from REI 3-4 may not be reliable because of its apparent location with respect to a transition in the Deep Aquifer. The high transmissivity values obtained from REI 3-4 in the REI 10 cluster tests were the result of the artificially greater drawdown observed at this location.

Values from REI-7 are not reliable because it is only partially screened across the upper portion of the Deep Aquifer. This is the cause for its delayed response, relative to its radial distance from the pumping well, in comparision with the initial responses and radial distances for the other observation wells.

REI 12-1 has the greatest radial distance of all the observation wells. It is also located where the Deep Aquifer increases in thickness. Because of these factors, the characteristics determined from REI-12-1 may not be representative of the Deep Aquifer underlying the French Limited site.

A. Transmissvity - The transmissivity values obtained from the most reliable data fall within the narrow range (less than one order of magnitude) of difference from 6.17×10^2 gpd/ft to 2.05×10^3 gpd/ft. Transmissivities in this range are generally characteristic of aquifers with a fair to good potential use as sources for domestic water supplies.

Transmissivities from REI 3-4 ranged from 9.17×10^0 gpd/ft to 1.03×10^3 gpd/ft, with a difference of more than two orders of magnitude. The lower values determined from the REI 3-4 Run #2 test data are considered to be more representative of the aquifer at that location. These lower values, ranging from 9.17×10^0 gpd/ft to 1.53×10^1 gpd/ft, are indicators of a significant difference in transmissivity within the Deep Aquifer, i.e., an apparent negative boundary condition.

B. <u>Storativity</u> - The storativity values ranged widely from $3.28 \times 10^{-5} \times 3.77 \times 10^{-1}$. The high value (obtained from REI 3-4, in the REI 3-4 Run #2 test) seems to be an anomaly in comparison with other values considered reliable. However, the presence of higher transmissive zones at REI 11 and REI 10-1 would have caused recharge to the lower transmissive area near REI 3-4. This would then result in artificially high storativities (after Driscoll, 1986).

C. <u>Hydraulic Conductivity</u> - The hydraulic conductivies obtained from the test data vary over a range of nearly three orders of magnitude. Some of the results may not be representative because of assumptions made in determining the saturated thickness (see Subsection 5.5.3). The hydraulic conductivity value from REI 12-1 and REI-7 are not considered to be representative of the Deep Aquifer.

Using the more reliable data, the hydraulic conductivities, ranged from 3.99×10^{-1} gpd/ft^2 (1.88×10^{-5} cm/sec) to 1.24×10^2 gpd/ft^2 (5.87×10^{-3} cm/sec) The former value was obtained from REI 3-4, in the REI 3-4 Run #2 test; the latter was obtained from REI 11, in the REI 10-1 Run #1 test. Comparisons with the charts (See Attachment 8) provided by both Driscoll (1986) and the U.S. Department of Interior: Ground Water Manual (1981) show that this range is comparative to the hydraulic conductivities ranging from a silt to a well-sorted, medium-grained sand.

5.10.3 <u>Boundary Conditions</u> - The data from all the tests seem to support the interpretation that a transition occurs in the Deep Aquifer, in the proximity of REI 3-4. This caused a bounded aquifer response in many of the observation wells. This interpretation offers a plausible explanation for the large differences in the specific capacities of REI 3-4 and REI 10-1, indicated by the different optimum pumping rate used in each respective test, as well as many other observations made from the data.

5.11 <u>Monitor Well GW-25 Removal</u>

5.11.1 <u>Removal Decision Basis</u> - During the 1986 Field Investigation, several factors indicated that monitor well GW-25 could be a possible source of vertical leakage between the shallow Alluvial zone, and Deep Aquifer. These factors are as follows:

- First, during the initial attempt to perform the "REI 10 Cluster" pumping test, a shallow Alluvial zone response was observed in monitor well REI 10-3 after pumping from the Deep Aquifer. This REI 10-3 response occurred promptly after the pumping test created drawdown in GW-25. Efforts to confirm the anomolous response in REI 10-3 were made by performing a second test, after partial equilibration of the aquifer. This test proved to be inconclusive. See Section 5.8 for a complete description of this activity.

- Secondly, Deep Aquifer water level measurements were taken on August 19, 1986 and a groundwater potentiometric map prepared as described in Subsection 5.4. The map showed that a minor "mounding" effect was ocurring in the GW-25 area (Plate 3, Attachment 3).

- Third, analysis (GC/MS) of groundwater samples from six (6) Deep Aquifer monitor wells was performed, and the GW-25 well sample reported the presence of trace contamination, while the other wells sampled indicated no pertinent contamination concentrations. This investigation is reported in Section 5.12 of this report.

Upon review of these results, a field decision was made to remove and seal monitor well GW-25. The procedure used, and the findings, as this decision was implemented, are described in the following subsection. GW-25 was installed on May 15-18, 1984.

5.11.2 Removal Procedure and Findings - The objectives of GW-25 well removal were to resolve the question of leakage from the shallow Alluvial zone into the Deep Aquifer via this artificial conduit, and to observe details of GW-25 construction so that potential reasons for this downward leakage could be noted.

The planned method to achieve this was to drill a boring of sufficient diameter to remove all PVC and any original grout from the borehole, and to fill the resulting hole to ground surface with an impervious cement and bentonite grout. The original boring was ten (10) inches in diameter to a depth of 58 feet to accommodate the surface casing, and six (6) inches in diameter from a 58-foot depth to 152 feet below the surface. To ensure that the drill bit used to destroy the well would not be deflected away from the well, a 1 foot long guiding rod was welded to the nose of the 5.5 inch diameter bit. This rod fit inside the PVC well pipe to guide the drill and maintain center. It was planned that after the PVC pipe had been removed, the boring would be reamed with a 12 or 14 inch diameter drill bit to remove the 6-inch diameter surface casing, and any remaining grout. After the boring had been reamed into natural materials, it was planned that the hole would be tremie grouted to the surface with a mixture of 96% cement and 4% bentonite jel (by weight).

All removed materials and fluids were to be disposed of in the French Limited Lagoon. The removal of GW-25 was begun on September 19, 1986 and the final seal grouting completed on September 29, 1986.

The actual removal was performed using a mud rotary drill rig, under the supervision of an REI hydrogeologist. The actual well removal procedures were adjusted from the planned methods as field decisions were made based on conditions encountered. Decisions which affected the removal methods were made by the REI hydrogeologist in consultation with the driller, the PRP representative, and other REI engineers. These adjustments from planned procedures were primarily aimed at maintaining the drilling within the original well boring.

All equipment used, observations, and decisions were documented in a field book. Photographs of crucial portions of the removal process were taken. Samples of well and grout materials brought to the surface were retained and inspected for signs of degradations.

During the drilling out process, it was found that the grout material was not providing an effective seal around the well casing and piping. Based on these observations it appeared that downward leakage from the shallow Alluvial zone to the Deep Aquifer could have occurred because of an inadequate grout seal of the well annulus.

A detailed log of the GW-25 drilling and grout process, and the observations regarding conditions found, is shown in Appendix 20.

5.12 Deep Aquifer Ground Water Analysis

5.12.1 Introduction - The 1986 Field Investigation installed three (3) additional Deep Aquifer Monitoring Wells for use in the various Deep Aquifer assessment tasks (REI 10-1, REI 11, REI 12-1). Installation and development of the new wells was performed as described in Subsection 5.4.

A Deep Aquifer Ground Water Analysis task was then implemented, which included the sampling of a total of six (6) monitor wells (REI 3-4, REI 7, REI 10-1, REI 11, REI 12-1 and GW-25). See the French Limited Site Map shown on Plate 1 in Attachments 1, for the location of these wells. Ground Water Samples were analyzed by GC/MS for priority pollutants. Approximate distances to each monitor well location from the nearest lagoon shoreline, and its direction from the lagoon, are shown as follows:

Well Number	Distance From Lagoon(Feet)	Direction From Lagoon
REI 3-4	650	South
REI 7	200	South
REI 10-1	75	South
REI 11	230	South
REI 12-1	490	North
GW-25	50	South

5.12.2 Sampling and Analysis - Prior to sampling, each well was purged of a minimum of three well volumes of water. Samples were collected using a Teflon bailer which was decontaminated prior to each use in accordance with standard procedures described in the French Limited Remedial Investigation Report of June, 1986. All sample containers used were specially prepared, sealed and labeled for laboratory analysis. Analytical parameters consisted of GC/MS priority pollutant Volatiles, Acid Extractables, and Base/Neutral Extractable Fractions.

5.12.3 Analytical Results - A summary of the analytical results of the groundwater sampling is provided in Table 5-8. The laboratory analytical reports are provided in Attachment 21.

5.12.4 Conclusions - The analytical data indicate that monitoring wells REI 3-4, REI 7, REI 11, and REI 12 contained no detectable concentrations of contaminants that were considered pertinent to the assessment. A concentration of 140 ppb of bis(2 ethylhexyl)phthalate) was reported at REI -7, but this was discounted because it is a common component of PVC piping materials. Monitor Well GW-25 was sampled during the 1984 and 1985 well sampling program and found to show trace contamination. As a result, REI 10-1 was installed 75 feet from GW-25 to assist in assessing the extent of that trace contamination.

Table 5-8

Deep Aquifer Ground Water Analytical Results

Parameter	Monitor Well					
	REI 3-4	REI 7	REI 10-1	REI 11	REI 12	GW-25
Volatile Organics (ug/l)						
Benzene	ND	ND	ND	ND	ND	101
Chloroethane	ND	ND	ND	ND	ND	56.1
1,1-Dichloroethane	ND	ND	ND	ND	ND	87.1
Ethylbenzene	ND	ND	ND	ND	ND	16.1
Toluene	ND	ND	ND	ND	ND	42.0
1,2-Trans-dichloroethylene	ND	ND	ND	ND	ND	17.8
Vinyl chloride	ND	ND	ND	ND	ND	226
Acid Fraction (ug/l)						
2,4-Dimethylphenol	ND	ND	ND	ND	ND	3.15
Phenol	ND	ND	4.16	ND	ND	89.2
Base/Neutral Fraction (ug/l)						
Bis(2-ethylhexyl) phthalate	ND	140	ND	ND	ND	11.7
Napthalene	ND	140	ND	ND	ND	7.83

Note: All other priority pollutant parameters reported not detected (ND)

The 1986 sample from GW-25 was found to contain a total of 546.0 ppb volatiles, 92.0 ppb acid compounds, and 19.6 ppb base/neutral compounds. REI 10-1 was found to contain 4.2 ppb of phenol.

These data, in conjunction with the known characteristics of the lower aquifer, indicate that contamination at GW-25 is probably the result of a vertical leak at that location. The 4.2 ppb of phenol found in REI 10-1 is probably the result of extended purging during the well development phase drawing contaminants from GW-25. If general contamination of the lower aquifer existed, REI 10-1 would be expected to contain much higher contaminant concentrations.

6.0 SHALLOW ALLUVIAL ZONE ASSESSMENT

6.1 Purpose - The objective of the REI 3-3 pumping test was to determine the hydrologic characteristics of the shallow Alluvial zone (transmissivity, storativity, hydraulic conductivity).

6.2 Scope - An aquifer characterization test was conducted at the REI 3-3 well cluster in 1985, and described in the French Limited Site Remedial Investigation Report of June, 1986. This pumping test was of short duration (approximately 73 minutes) and was based on using only 2 observation wells.

The task for the 1986 Field Investigation was designed to repeat the test at REI 3-3, using 3 observation wells and extending the test duration to approximately 15 hours.

6.3 Pumping Test Procedures

6.3.1 Pre-Test Activities - Before the start of the pumping test at REI 3-3, the following preparatory tasks were performed.

An additional observation point for the pumping test was provided by installing a new well, REI 3-5 approximately 40 feet from REI 3-3. This well was screened across the same zone as REI 3-3 and piezometer P 3-3. The description of its construction is provided in Appendix 12 and its boring log is provided in Appendix 13. The well was fully developed, in accordance with procedures described in the French Limited Site Remedial Investigation Report of June, 1986.

A second step in the pre-test activities was selection of a test flow rate which would provide adequate stress for determining aquifer characteristics. The specific capacity data that had been derived from the previous REI 3-3 pump test (described in the Remedial Investigation Report; June 1986) was used. A 3.0 gpm flow rate was selected and used in the 1986 test.

An electric submersible pump was installed in REI 3-3, with dedicated hoses and polypropylene rope secured together by nylon ties. This pump had been decontaminated prior to installation. Clean disposable gloves were worn when handling both the pump and the hose to prevent the addition of artifactual constituents to REI 3-3.

Water level measurements were taken from REI 3-3, REI 3-5, and P 3-3 before and after the pump was installed to determine background static water levels. The equilibration of the water level in REI 3-3 after pump installation was also monitored.

6.3.2 <u>Test Execution</u> - Immediately before starting the test, all watches used in the test were synchronized for time accuracy. After the pump was started discharge flow was regulated to the specified 3.0 gpm flow rate, within less than 1 minute of the starting time.

The flow rate was monitored constantly during the initial and critical 2 to 3 hours. During this period, readings were collected and documented approximately every 5 to

10 minutes on the appropriate record sheets. After this initial period, the flow meter readings were documented approximately every 15 to 30 minutes through the remainder of the test. Adjustments were made throughout the test, as necessary, to maintain the flow rate to within ±10 percent of the 3.0 gpm rate.

Drawdown and recovery data were collected from REI 3-3, REI 3-5, and P 3-3 during the test. The changes in the water levels of these three observation wells were measured with a dedicated Well Wizard Series 6000 well sounder at each well. Experienced pump test personnel collected these measurements on logarithmic time intervals as directed by the on-site hydrogeologist. These readings were collected with a ±0.01 ft. accuracy objective, and were documented on appropriate record sheets for each well.

Progress of the pumping test was monitored by plotting data as it was collected during the test, on log-log and semi-log graph paper.

6.3.3 Post-Test Activities - After field activities were completed, the drawdown and recovery data were computed with a programmed Hewlett-Packard HP-41CX. These data were checked for errors as part of quality assurance. The computed data were then plotted by hand on K+E 8-1/2 x 11 log-log and semi-log graph paper for analysis. These plots were also checked for accuracy.

The two methods of analysis for the drawdown data were the Theis non-equilibrium solution (Theis, 1935; Health and Trainer, 1981) and the time vs. drawdown modification to the Theis non-equilibrium solution by Cooper and Jacob (Driscoll, 1981). The recovery data were also analyzed by both of these methods, using the assumption of Theis' corollary, and the residual drawdown plot solution (Driscoll, 1981).

For the log-log plots, the resulting curves were matched using a reversed type curve provided in the U.S. Department of Interior: Ground Water Manual, A Water Resources Technical Publication (1981; Figure 5-5). Only the portion of each curve plot considered to be reliable was utilized in the hydrogeologist's interpretation of where the curve matched the type curve.

For the semi-log plots, the most reliable data was selected to identify a straight-line intersect from the plots. In some cases, two intersects were identified and considered to provide a range.

The aquifer characteristics were calculated using the data obtained from the plots. The formulas used are specifically cited by each solution method employed. Some additional data necessary for the calculations, such as the flow rate (Q), were taken from the pumping test results.

The saturated thickness of the aquifer (b) was determined using the screen length of each observation well for consistency.

Results for transmissivity and hydraulic conductivity were expressed in both English Standard Units and SI-Metric units for convenience.

6.4 REI 3-3 Pumping Test

6.4.1 Description of the Test - The test's operational parameters and observation well information are described in Table 6-1. Installation and construction details for REI 3-5 are provided in Appendix 12. The installation and construction details for REI 3-3 and P 3-3 are provided in the Remedial Investigation Report (June, 1986) for the French Limited site.

REI 3-3, REI 3-5, and P 3-3 are all screened across the uppermost unit of the Alluvial zone. This shallow unit was previously described in the Remedial Investigation Report (June, 1986) as being unconfined. At the time the 1986 pumping test was conducted, this unit appeared to be confined, or at least semi-confined, at the REI 3 cluster location. This observation is based upon the static water level measurements collected from the observation wells prior to beginning the test. The surface water pond, located adjacent to this well cluster (approximately 60 to 100 feet away) is probably responsible for these conditions. A significant recharge boundary was observed at 55 to 60 minutes into the test, as

TABLE 6-1

TEST NAME: REI 3-3 PUMPING TEST

DURATION OF PUMPING: From 8-11-86 @ 1830 to 8-12-86 @ 0915 (885 minutes)

DURATION OF RECOVERY: From 8-12-86 @ 0915 to 8-12-86 @ 1130 (135 minutes)

	COMMENTS
PUMPING WELL: REI 3-3	REI 3-3 is screened 14 ft across the Alluvial zone. The top of screen is located 8.5 ft below the surface.
PUMP INTAKE LOCATION:	18 ft (approx.) below the surface.
OBSERVATION WELLS:	
REI 3-3	Screened 14 ft across the Alluvial zone (RADIUS = 0.16 ft).
REI P-3-3	Screened 14 ft across the Alluvial zone (RADIUS = 12.42 ft).
REI 3-5	Screened 15 ft across the Alluvial zone (RADIUS = 39.33 ft).

FLOW RATE DATA SUMMARY

Flow Rate (gpm)	From	To	Comments
3.0	8/11/86 @ 18:30	8/12/86 @ 09:15	Flow was maintained within ±10% of 3.0 gpm.

Pumping Rate Monitoring: Dwyer Series VFC Visifloat Flowmeter (range = 0.6 to 6.0 gpm, accuracy ±0.005).

represented in the log-log and semi-log drawdown plots from the observation wells. The surface water pond would appear to be the likely source for the observed recharge. This recharge boundary was also observed in the REI 3-3 pumping test, conducted during the 1985 field investigation.

6.4.2 Results - The hydrological characteristics of the shallow Alluvial zone were derived from an analysis of data collected from three observation wells. The values for the hydrologic characteristics are presented in Table 6-2. The calculations for transmissivity and storativity values were made using a 3.0 gpm flow rate. This flow rate was maintained constant with ±10 percent or less fluctuation throughout the drawdown phase of the test. Recovery data were also analyzed for the determination of characteristics.

A. Aquifer Characteristics

1. Transmissivity - The transmissivity of the Alluvial zone was determined to range from 2.42×10^2 gpd/ft. (3.48×10^{-5} m^2/sec) to 1.58×10^3 (1.58×10^{-4} m^2/sec), based on the most reliable data from REI 3-5. Transmissivities in this range are characteristic of aquifers with a fair to good potential use as a source for domestic well supplies, but poor potential for usages requiring large volumes, such as irrigation; this is based on a comparison with the table in Attachment 7. (Source: U.S. Department of Interior, Ground Water Manual, 1981). The transmissivity

TABLE 6-2

REI 3-3 Pumping Test - Hydrologic Characteristics Summary

Observation Well	Analysis Method	Transmissivity (T)		Storativity (S)	Hydraulic Conductivity (K)	
		gpd/ft	m^2/sec		gpd/ft^2	cm/sec
REI 3-3						
Drawdown	Log-Log	*	*	*	*	*
	Semi-Log	5.21×10^{2}	7.49×10^{-5}	3.66×10^{0}	3.72×10^{1}	1.75×10^{-3}
Recovery	Log-Log	7.16×10^{2}	1.03×10^{-4}	-	5.12×10^{1}	2.41×10^{-3}
	Semi-Log a	6.71×10^{2}	9.65×10^{-5}	-	4.79×10^{1}	2.26×10^{-3}
		6.66×10^{2}	9.57×10^{-5}	-	-	-
	Semi-Log b	8.77×10^{2}	1.26×10^{-4}	-	-	-
REI 3-5						
Drawdown	Log-Log	6.14×10^{2}	8.83×10^{-5}	1.30×10^{-3}	4.04×10^{1}	1.90×10^{-3}
	Semi-Log	7.76×10^{2}	1.12×10^{-4}	9.31×10^{-3}	5.11×10^{1}	2.41×10^{-3}
Recovery	Log-Log	1.07×10^{3}	1.54×10^{-4}	-	7.07×10^{1}	3.33×10^{-3}
	Semi-Log a	1.00×10^{3}	1.44×10^{-4}	-	6.60×10^{1}	3.11×10^{-3}
	Semi-Log b	4.58×10^{3}	2.28×10^{-4}	-	-	-
		1.11×10^{3}	1.59×10^{-4}	-	-	-
P 3-3						
Drawdown	Log-Log	2.42×10^{2}	3.48×10^{-5}	5.57×10^{-3}	1.73×10^{1}	8.15×10^{-4}
	Semi-Log	3.34×10^{2}	4.81×10^{-5}	4.06×10^{-3}	2.39×10^{1}	1.13×10^{-3}
Recovery	Log-Log	3.78×10^{2}	5.43×10^{-5}	-	2.70×10^{1}	1.27×10^{-3}
	Semi-Log a	5.14×10^{2}	7.40×10^{-5}	-	3.67×10^{1}	1.73×10^{-3}
	Semi-Log b	5.58×10^{2}	8.02×10^{-5}	-	-	-

* could not determine

- not analyzed

values obtained from REI 3-3 are somewhat less, but generally fall within the range of values from REI 3-5. The values from P 3-3 are significantly lower than both REI 3-3 and REI 3-5.

These values may be artificially lower because of its relatively shorter distance from the surface water pond as compared to the other wells. The location of an observation well near a recharge source will cause transmissivity values to be artificially lower (Driscoll, 1981). This is opposite of the effect which would be caused by a negative boundary condition, as observed in the Deep Aquifer pumping tests at the REI 10 cluster.

2. Storativity - The storativity values obtained ranged from 1.30×10^{-3} (from REI 3-5) to 3.66×10^{0} (from REI 3-3). The latter value, because it is greater than 1 (an impossible value) indicates that significant recharge occurred during the test (Driscoll, 1981). Using the most reliable data, the highest storativity value obtained was 9.31×10^{-3}. The overall range of these storativities would be considered to be relatively high for a confined aquifer.

3. Hydraulic Conductivity - The reliable values for hydraulic conductivity ranged from 3.72×10^{1} gpd/ft^2 (1.75×10^{-3} cm/sec) to 7.07×10^{1} gpd/ft^2 (3.33×10^{-3} cm/sec). These values represent an average hydraulic conductivity; the Alluvial zone is stratified (non-homogenous) as identified in the boring log data. Comparison with the charts (see Attachment 8) provided by both Driscoll (1986) and

the U.S. Department of Interior: Ground Water Manual (1981), shows that the range compares with the hydraulic conductivity of silty sand of fine-grained sand.

6.5 Conclusions REI 3-3 Pumping Test - The aquifer characteristics for the shallow Alluvial zone may be best represented by those values obtained from REI 3-5. The values from REI 3-3 generally support the data obtained from REI 3-5; however, because REI 3-3 was utilized as the pumping well during the test, the values from it would have to be considered to be less reliable than values from observation wells.

The results obtained from P 3-3 cannot be considered reliable because of its proximity to an apparent recharge source (the surface water pond). In particular transmissivity values, were found to be much lower than the other two observation wells; this is probably the result of recharge rather than a variation in characteristics.

Detailed construction details apparently do not exist for P 3-3. In order to solve for hydraulic conductivity, an assumed value of 14.0 ft. (the same as REI 3-3) was used for the saturated thickness (b), in the calculations. The transmissivity values indicate the Alluvial zone has a fair to good potential use for domestic water supplies, but a poor potential use for larger volume usages such as irrigation; this is based on the comparison with the table in Attachment 7.

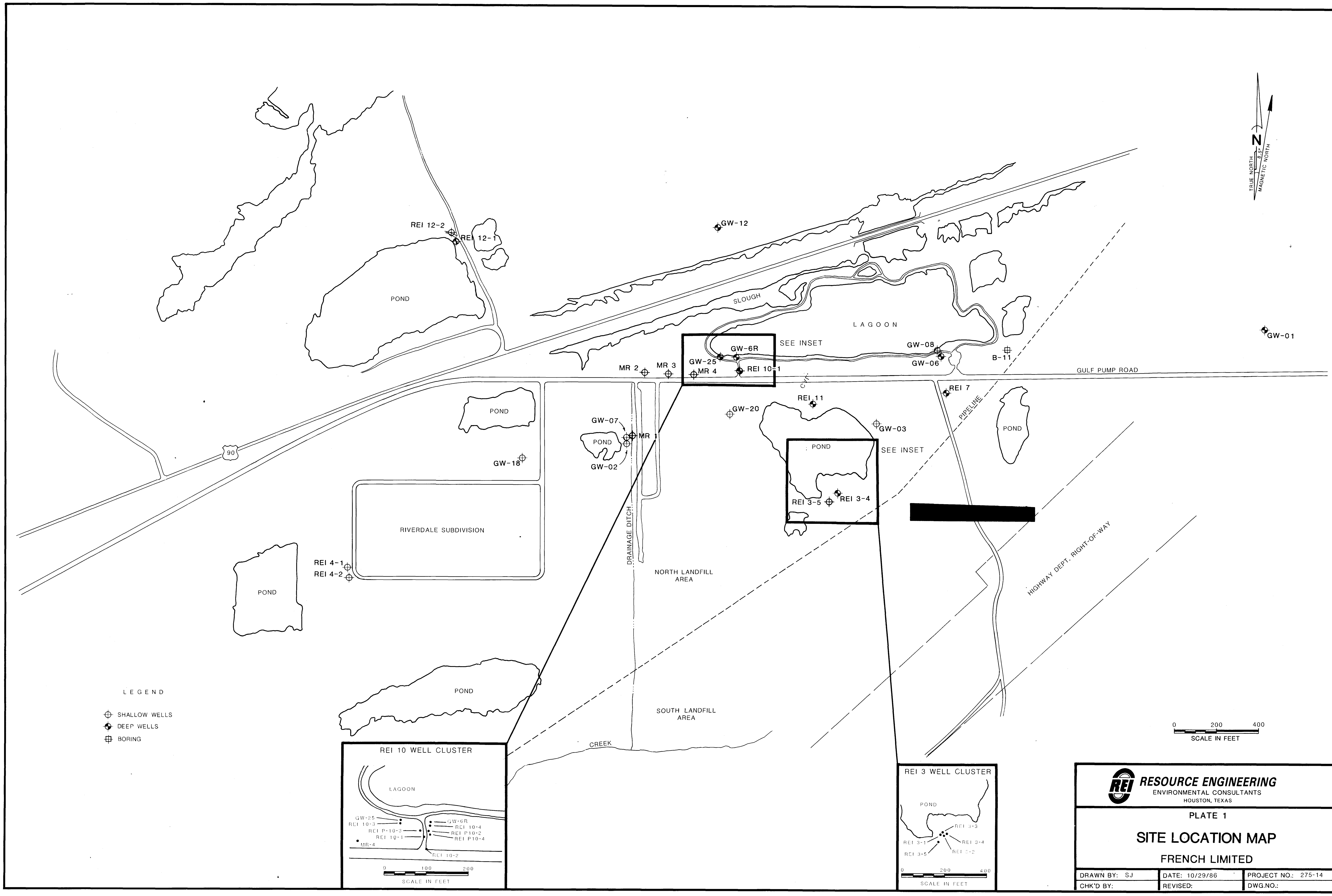
The storativity values from the test are not considered to be reliable, i.e., representative of the Alluvial zone, because of the recharge conditions observed. A significant recharge boundary was observed initially at 55 to 60 minutes into the test. The surface water pond, located adjacent to the REI 3 well cluster, is considered to be the likely source for the recharge conditions.

The hydraulic conductivities determined from the results of the tests are comparative to the hydraulic conductivity of a silty sand or fine-grained sand. The boring logs of REI 3-5 and REI 3-3 generally supports this identification.

The aquifer characteristics were determined based on the assumption that confined aquifer conditions had existed at the time of the test, as was indicated by data collected prior to the test. Previously, the upper unit of the Alluvial zone had been expected to be unconfined. It would appear, then, that the confined conditions observed at the REI 3-3 may be localized, due to the effects of the surface water pond. It is also possible that, because of the apparent hydrologic connection between the shallow zone and the surface water pond, seasonal fluctuations of the water level in the surface water pond caused by precipitation, may cause the condition of the shallow zone to vary from confined to unconfined periodically. Thus, when this variation occurs, it then can also be assumed that the aquifer characteristics may also vary to some degree from those values obtained during this test. Given that "ground-water hydrology is dynamic and an inexact science," (U.S. Department of Interior: Ground Water Manual, 1981; pg. 65) the values for characteristics at this location should not be considered as absolute values, but rather as approximations, within ±1 order of magnitude of the true values.

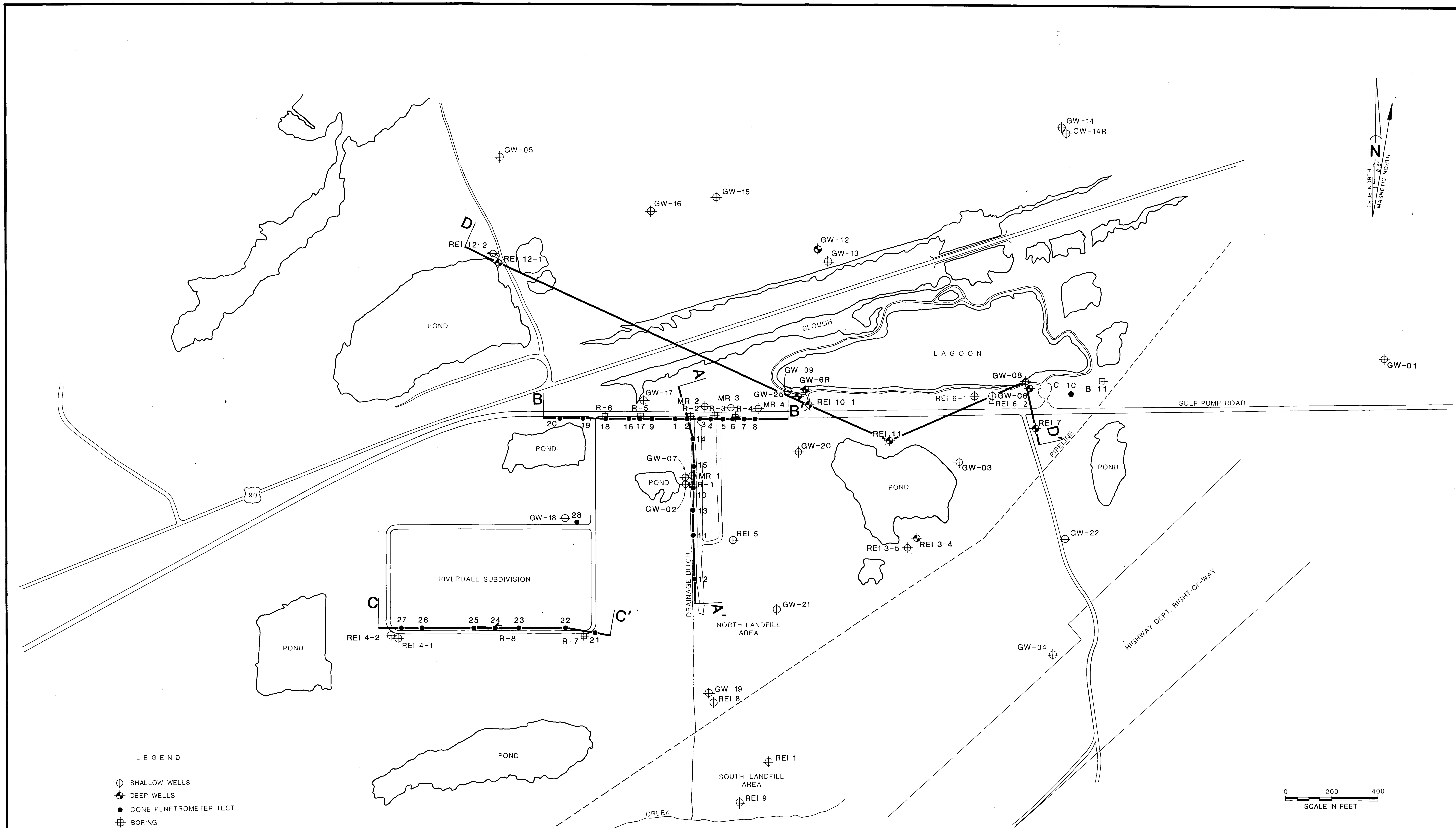
Attachment 1

Plate 1 - Site Location Map


TRUE NORTH
MAGNETIC NORTH
N
POND
REI 12-2
REI 12-1
GW-12
SLOUGH
LAGOON
SEE INSET
GW-6R
GW-25
MR 4
REI 10-1
MR 2
MR 3
GW-08
GW-06
B-11
GW-01
GULF PUMP ROAD
REI 7
PIPELINE
REI 11
GW-20
GW-03
POND
SEE INSET
POND
REI 3-5
REI 3-4
POND
90
POND
GW-07
MR 1
GW-02
GW-18
RIVERDALE SUBDIVISION
DRAINAGE DITCH
[redacted]
HIGHWAY DEPT. RIGHT-OF-WAY
REI 4-1
REI 4-2
POND
NORTH LANDFILL AREA
SOUTH LANDFILL AREA
POND
CREEK
LEGEND
SHALLOW WELLS
DEEP WELLS
BORING
0 200 400
SCALE IN FEET
REI 10 WELL CLUSTER
LAGOON
GW-25
REI 10-3
REI P-10-3
REI 10-1
MR-4
GW-6R
REI 10-4
REI P10-2
REI P10-4
REI 10-2
0 100 200
SCALE IN FEET
REI 3 WELL CLUSTER
POND
REI 3-3
REI 3-1
REI 3-4
REI 3-5
REI 3-2
0 200 400
SCALE IN FEET
RESOURCE ENGINEERING
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS
PLATE 1
SITE LOCATION MAP
FRENCH LIMITED
DRAWN BY: SJ
DATE: 10/29/86
PROJECT NO.: 275-14
CHK'D BY:
REVISED:
DWG.NO.:

Attachment 2

Plate 2 - 1986 Field Investigation Map



RESOURCE ENGINEERING
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

PLATE 2

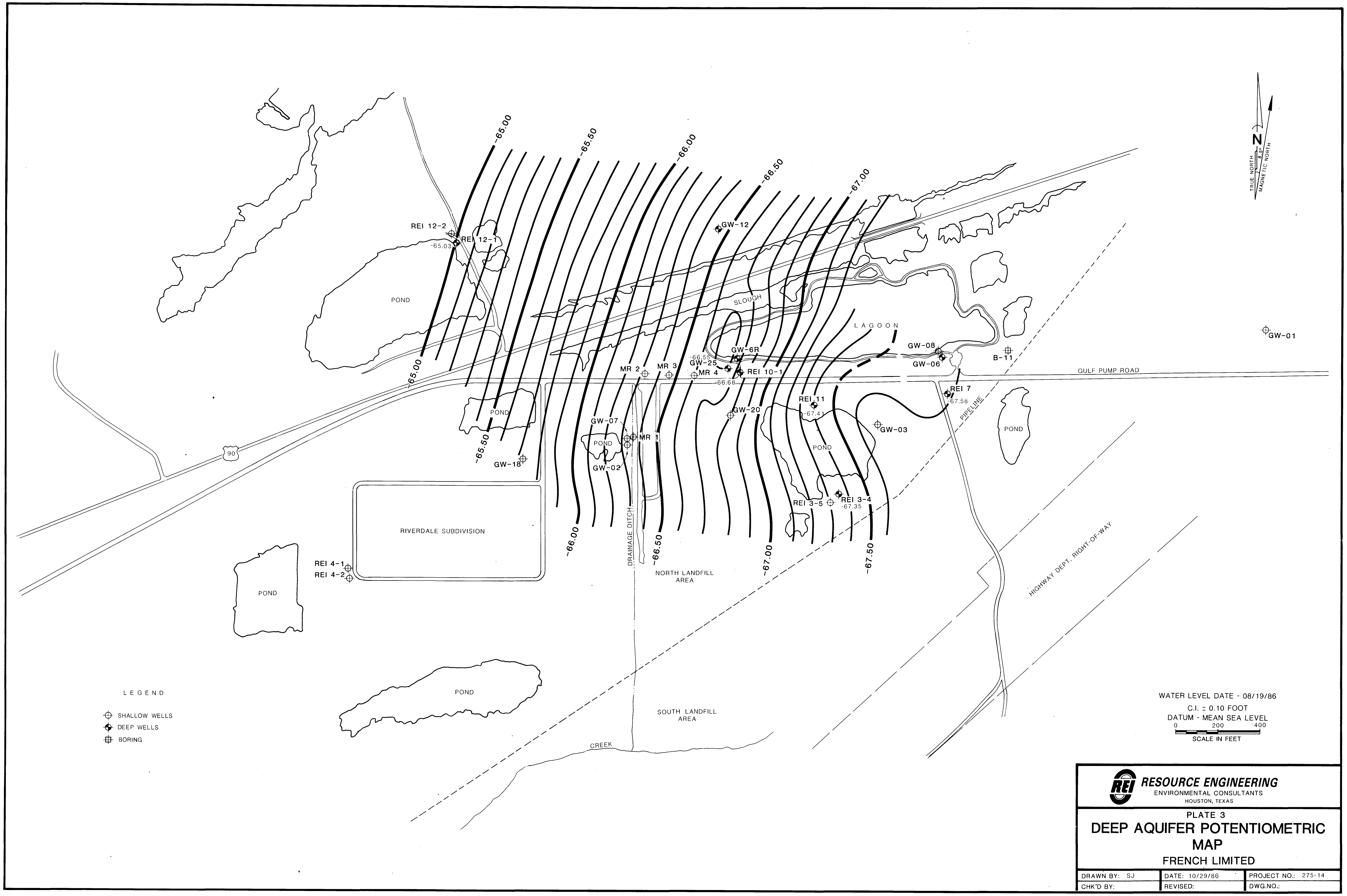
1986 FIELD INVESTIGATION ACTIVITIES

FRENCH LIMITED

DRAWN BY: SJ	DATE: 10/29/86	PROJECT NO.: 275-14
CHK'D BY:	REVISED:	DWG.NO.:

Attachment 3

Plate 3 - Deep Aquifer Potentiometric Map
8/19/86



RESOURCE ENGINEERING
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

PLATE 3

DEEP AQUIFER POTENTIOMETRIC MAP

FRENCH LIMITED

DRAWN BY: SJ	DATE: 10/29/86	PROJECT NO.: 275-14
CHK'D BY:	REVISED:	DWG.NO.:

Attachment 4

Plate 4 - Deep Aquifer Potentiometric Map
10/30/86

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

PLATE 4

DEEP AQUIFER POTENTIOMETRIC MAP

FRENCH LIMITED

DRAWN BY: SJ	DATE: 10/29/86	PROJECT NO.: 275-14
CHK'D BY:	REVISED:	DWG.NO.:

Attachment 5

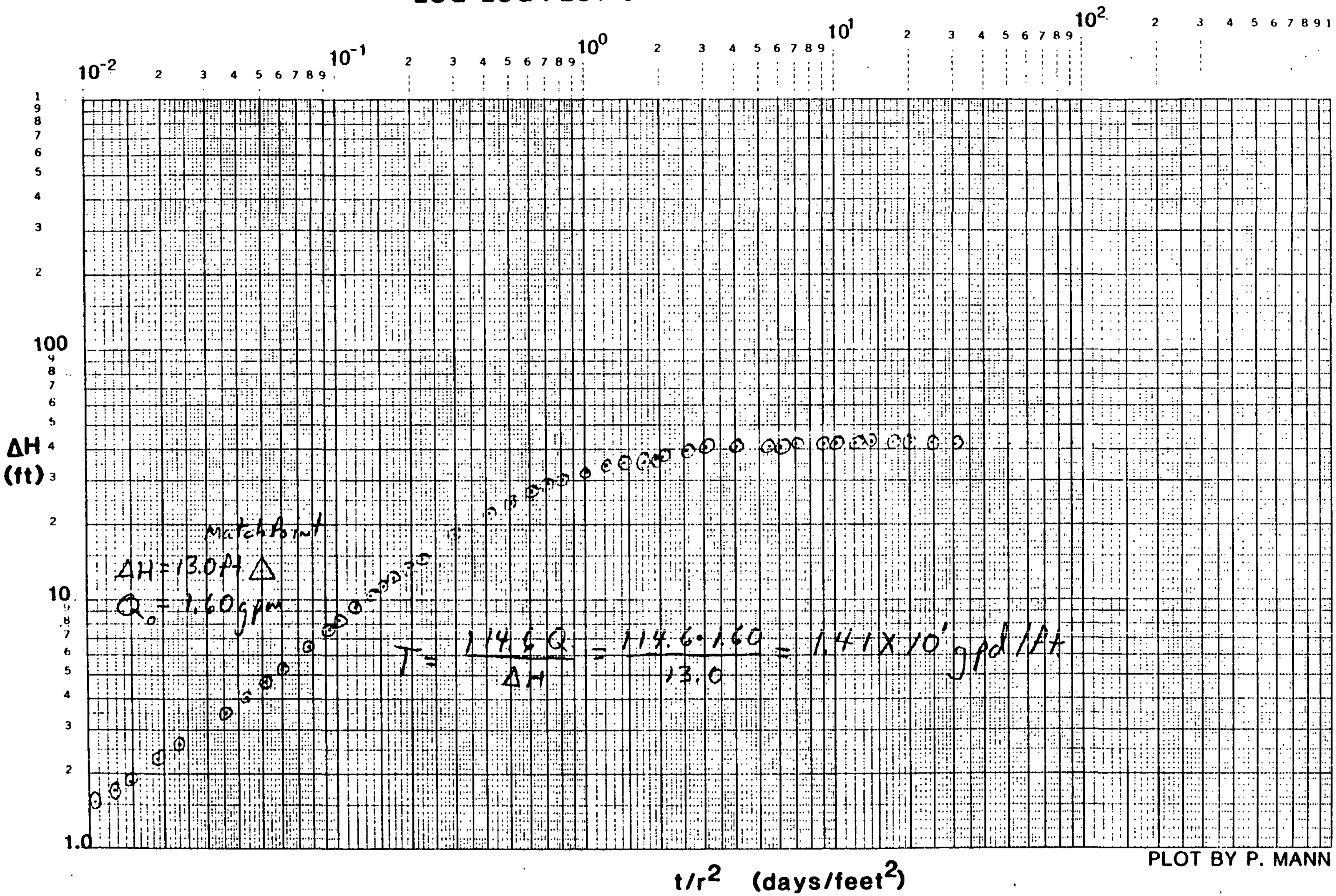
REI 3-4 Run #2 Pumping Test
Response Curves and Aquifer
Characteristics Calculations

K·Σ LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-4 8/21/86



PLOT BY P. MANN

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ___

PROJECT: Fremont [illegible] JOB NO.: 274-14

SUBJECT: REI 3-4 Run #2 Calc. for REI 3-4

COMPUTED BY: DRS DATE: 11-17-[illegible]

CHECKED BY: DD DATE: 11-15-86

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 13.0$ ft. $\quad T = \frac{(114.6)(1.60)}{13.0} = \boxed{1.41 \times 10^{1} \text{ gpd/ft}}$

$Q = 1.60$ gpm

X Conversion Factor 1.438×10^{-7} $= \boxed{2.03 \times 10^{-6} \text{ m}^2/\text{s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 5.0 \times 10^{-2}$ days/ft^2

$T = \boxed{1.41 \times 10^{1} \text{ gpd/ft}}$

$$S = \frac{(1)(1.41 \times 10^{1})(5.0 \times 10^{-2})}{1.87} = \boxed{3.77 \times 10^{-1}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

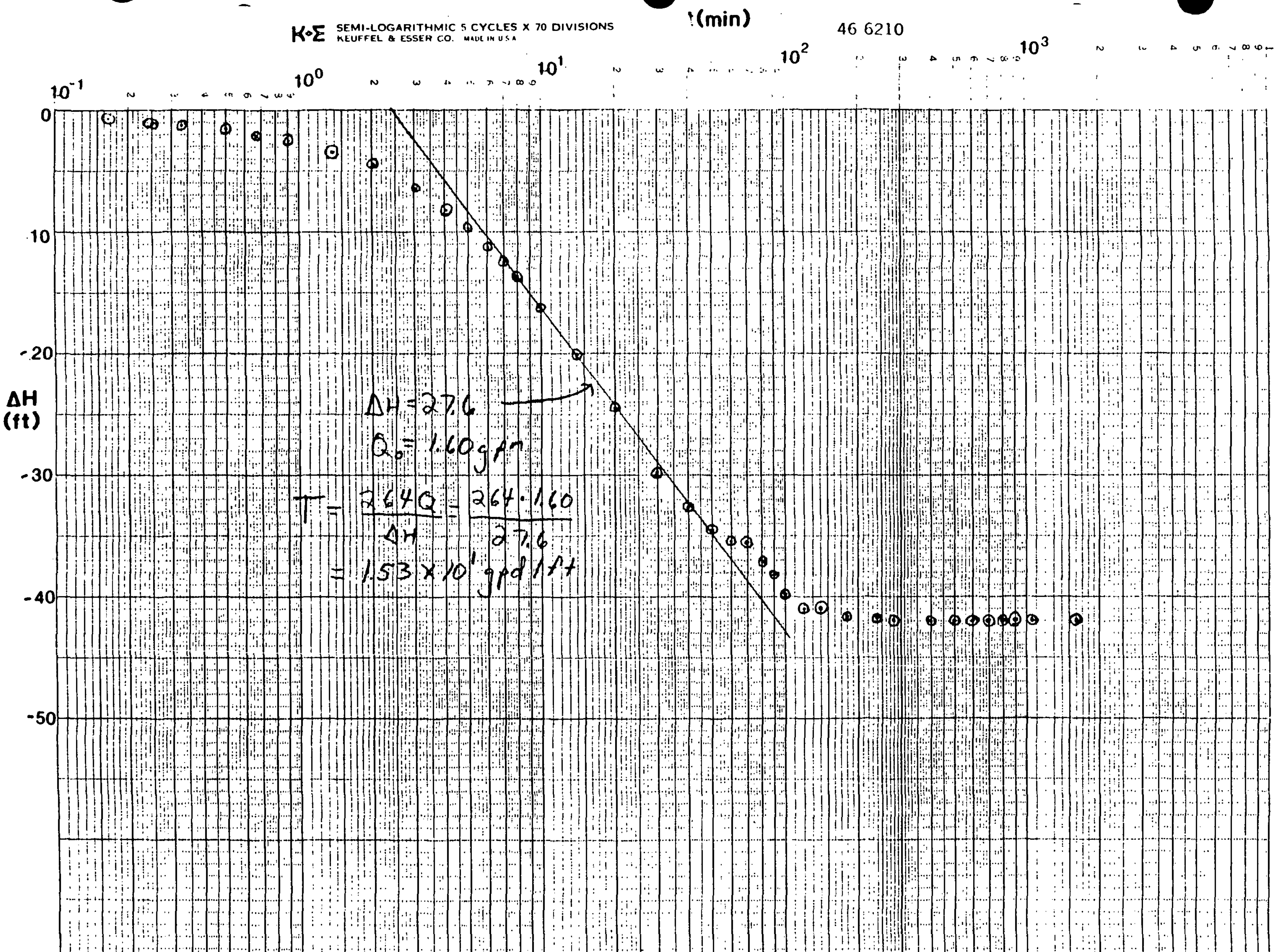
$T = \boxed{1.41 \times 10^{1} \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{1.41 \times 10^{1}}{23.0} = \boxed{6.13 \times 10^{-1} \text{ gpd/ft}^2}$$

X Conversion Factor 4.715×10^{-5} $= \boxed{2.89 \times 10^{-5} \text{ cm/s}}$

ERT



REI 3-4 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI 3-4 8/21/86

PLOT BY S. CAYLOR

CALCULATIONS AND COMPUTATIONS — SHEET ___ OF ___

PROJECT: FRENCH LTD. — JOB NO.: 275-14

SUBJECT: REI 3-4 Run #2 Calc for REI 3-4 — COMPUTED BY: DRG DATE: 11-17-86 — CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 1.60$ gpm

$\Delta H = 27.6$ ft $T = \frac{(264)(1.60)}{27.6} = \boxed{1.53 \times 10^{1} \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{2.20 \times 10^{-6} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3 T t_0}{r^2}$$

$r = 0.166$ ft.

$t_0 = 2.45$ min./1440 = 1.70×10^{-3} days

$T = \boxed{1.53 \times 10^{1} \text{ gpd/ft}}$

$$S = \frac{(0.3)(1.53 \times 10^{1})(1.70 \times 10^{-3})}{(0.166)^2} = \boxed{2.83 \times 10^{-1}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{1.53 \times 10^{1} \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{1.53 \times 10^{1}}{23.0} = \boxed{6.65 \times 10^{-1} \text{ gpd/ft}^2}$$

X Conversion Factor 4.715×10^{-5} = $\boxed{3.14 \times 10^{-5} \text{ cm/s}}$

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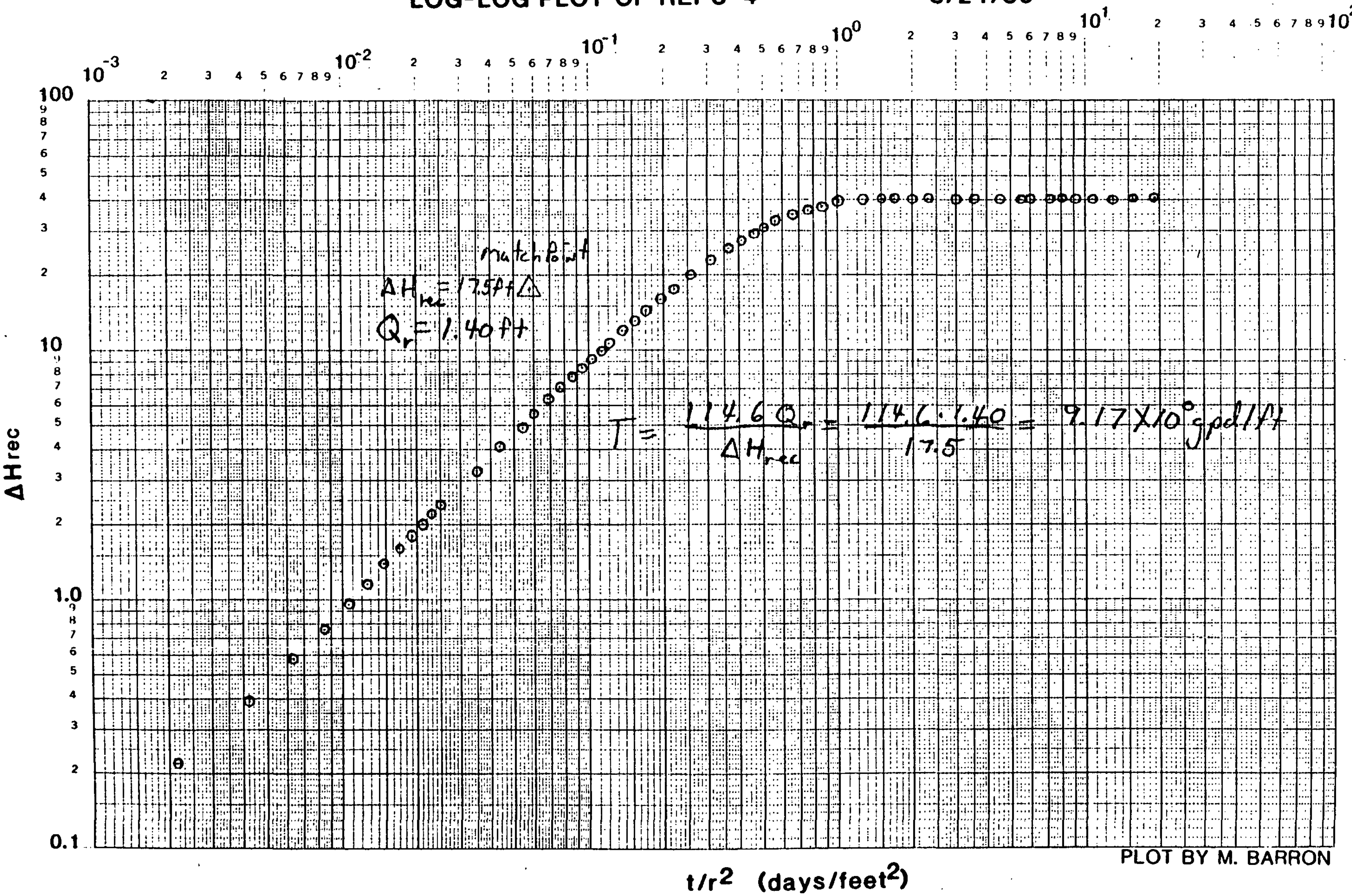
K•Σ LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

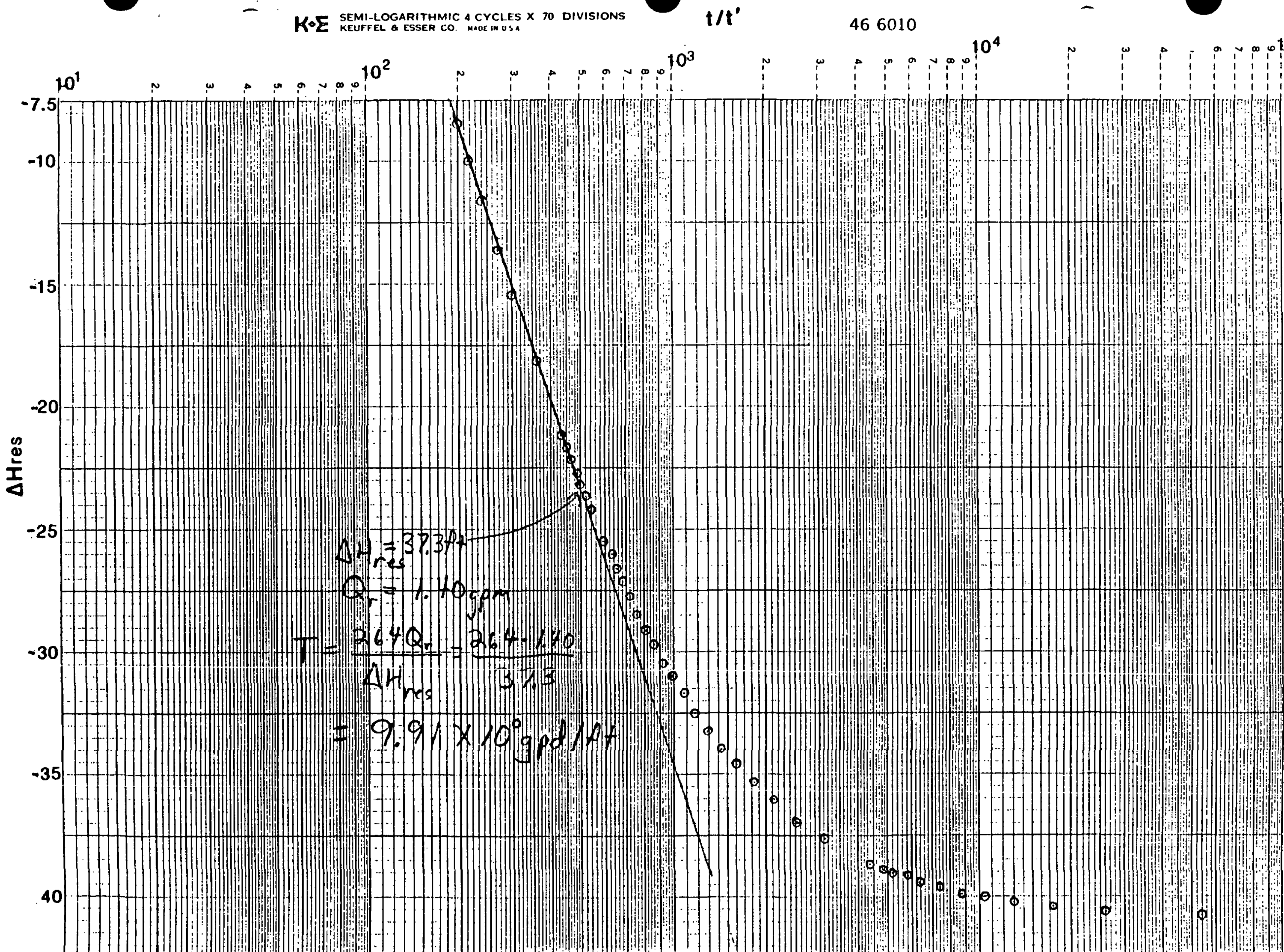
46 7520

REI 3-4 RUN #2 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI 3-4 8/21/86



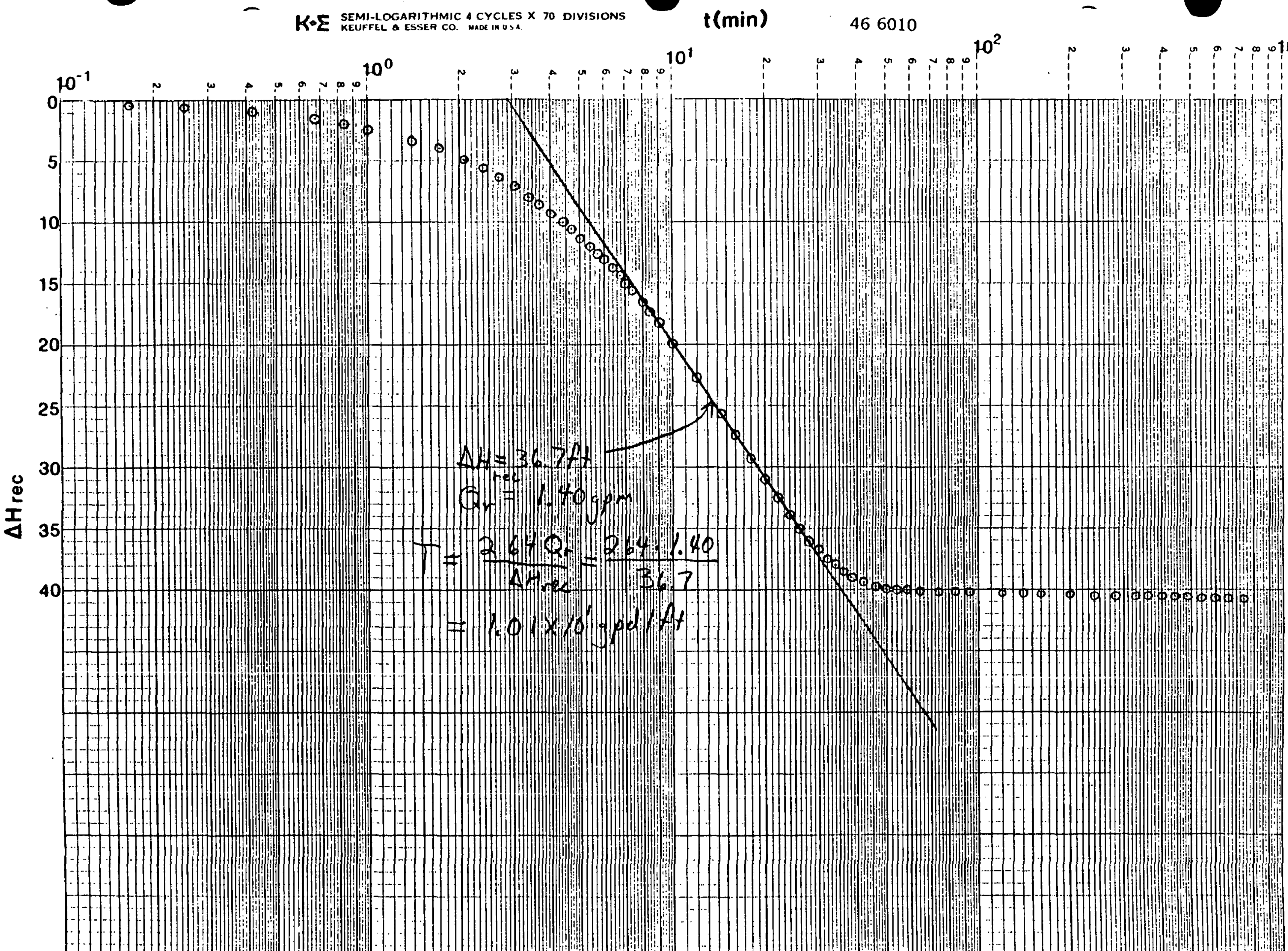
PLOT BY M. BARRON



REI 3-4 RUN #2 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF REI 3-4 8/21/86

PLOT BY M. BARRON



REI 3-4 RUN #2 PUMP TEST - RECOVERY PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 3-4 8/21/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French LTD.

JOB NO.: 275-16

SUBJECT: REI 3-4 Run #2 Calc. for REI 3-4

COMPUTED BY: DRS DATE: 11-17-80

CHECKED BY: DD DATE: 11-18-80

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 17.5$ ft

$Q = 1.40$ gpm

$$T = \frac{(114.6)(1.40)}{17.5} = \boxed{9.17 \times 10^{0} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.32 \times 10^{-6} \text{ m}^2/\text{s}}$$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{9.17 \times 10^{0} \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{9.17 \times 10^{0}}{23.0} = \boxed{3.99 \times 10^{-1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.88 \times 10^{-5} \text{ cm/s}}$$

Semi-Log (a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 1.40$ gpm

$\Delta H_{res} = 37.3$ ft

$$T = \frac{(264)(1.40)}{37.3} = \boxed{9.91 \times 10^{0} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.42 \times 10^{-6} \text{ m}^2/\text{s}}$$

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CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: [illegible]

SUBJECT: PEI 3-4 Run #2 Calc for REI 3-4

COMPUTED BY: DRC DATE: 11-12-[illegible]

CHECKED BY: DD DATE: 11-19-8[illegible]

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{9.91 \times 10^{0} \text{ gpd/ft}}$

$b = 23.0$ ft

$K = \frac{9.91 \times 10^{0}}{23.0} = \boxed{4.31 \times 10^{-1} \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.716 \times 10^{-5} = \boxed{2.03 \times 10^{-5} \text{ cm/s}}$

Semi-Log(t) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264Q}{\Delta s_{rec}}$

$Q = 1.40$ gpm

$\Delta s_{rec} = 36.7$ ft $\quad T = \frac{(264)(1.40)}{36.7} = \boxed{1.01 \times 10^{1} \text{ gpd/ft}}$

$\times$ Conversion Factor $1.438 \times 10^{-7} = \boxed{1.45 \times 10^{-6} \text{ m}^2\text{/s}}$

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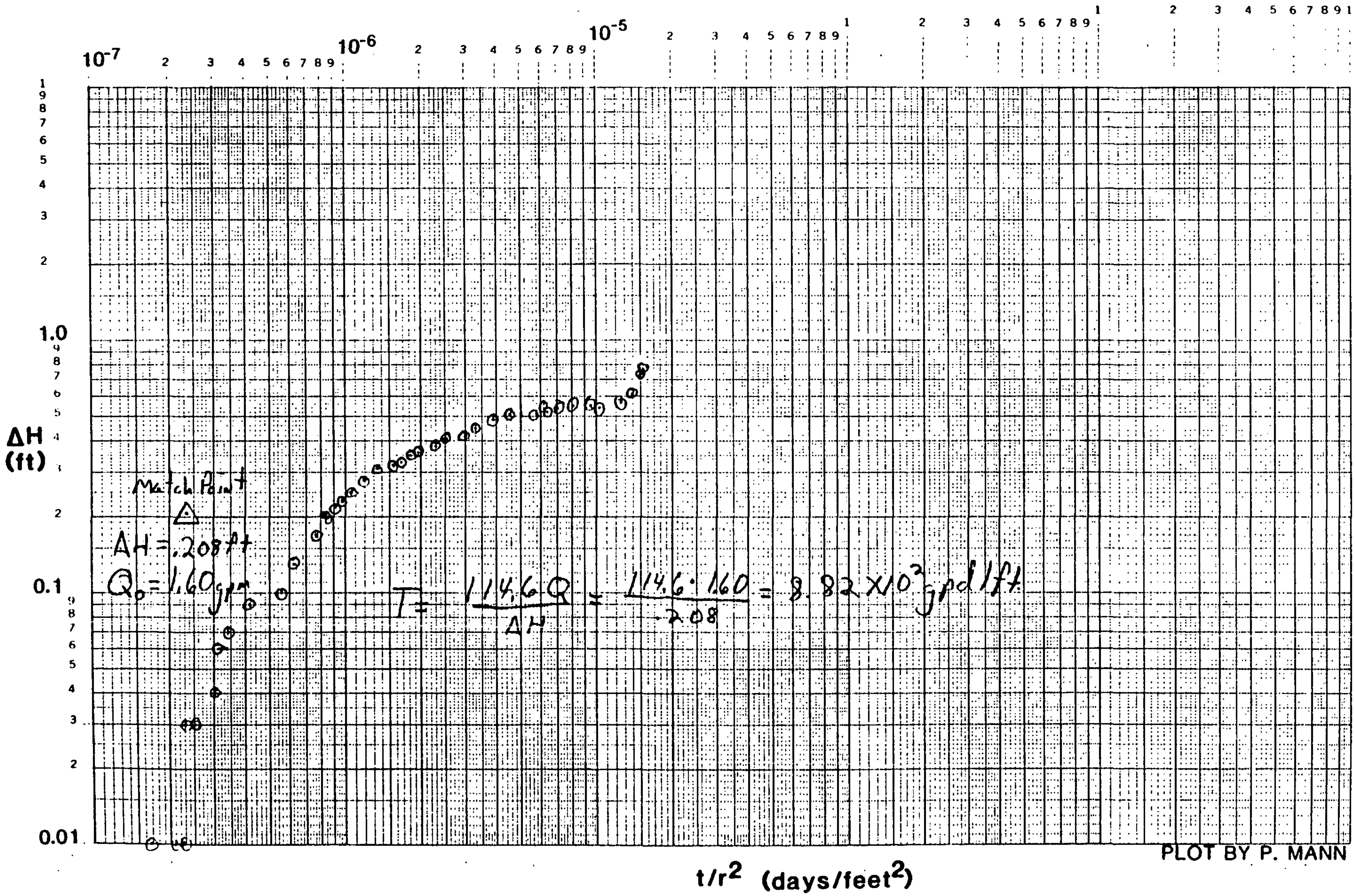
REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI-11 8/21/86



PLOT BY P. MANN

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 3-4 Run#2 Calc. for REI 11

COMPUTED BY: DRG DATE: 11-17-?

CHECKED BY: DD DATE: 11-19-8?

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 0.208$ ft

$Q = 1.60$ gpm

$$T = \frac{(114.6)(1.60)}{0.208} = \boxed{8.82 \times 10^2 \text{ gpd/ft}}$$

$$\text{X Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.27 \times 10^{-4} \text{ m}^2\text{/s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 2.35 \times 10^{-7}$ days/ft^2

$T = \boxed{8.82 \times 10^2 \text{ gpd/ft}}$

$$S = \frac{(1)(8.82 \times 10^2)(2.35 \times 10^{-7})}{1.87} = \boxed{1.11 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{8.82 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$$K = \frac{8.82 \times 10^2}{16.45} = \boxed{5.36 \times 10^1 \text{ gpd/ft}^2}$$

$$\text{X Conversion Factor } 4.715 \times 10^{-5} = \boxed{2.53 \times 10^{-3} \text{ cm/s}}$$

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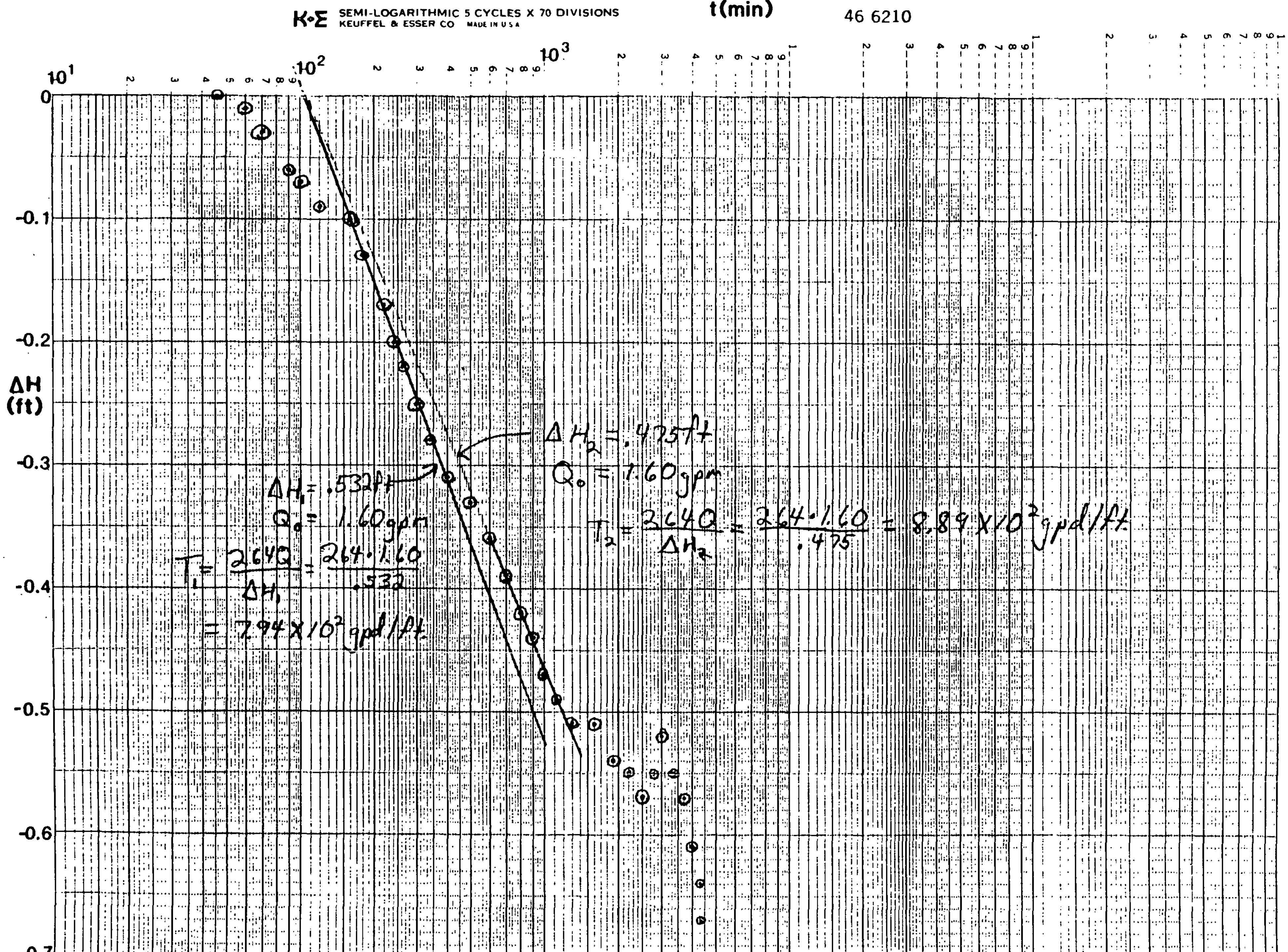


REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

SEMI LOG PLOT OF REI-11

PLOT BY S. CAYLOR

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 3-4 Run #2 Calc for REI 11

COMPUTED BY: DRG DATE: 11-12-8_

CHECKED BY: DD DATE: 11-19-8_

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 1.60 \text{ gpm}$

$\Delta H_1 = 0.532 \text{ ft} \quad T_1 = \frac{(264)(1.60)}{0.532} = \boxed{7.94 \times 10^2 \text{ gpd/ft}}$

$\Delta H_2 = 0.475 \text{ ft} \quad T_2 = \frac{(264)(1.60)}{0.475} = \boxed{8.89 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{1.14 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{1.28 \times 10^{-4} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3 T t_0}{r^2}$$

$r = 446.391 \text{ ft.}$

$t_{0_1} = 105 \text{ min}/1440 = 7.29 \times 10^{-2} \text{ days}$

$T_1 = \boxed{7.94 \times 10^2 \text{ gpd/ft}}$

$t_{0_2} = 105 \text{ min}/1440 = 7.29 \times 10^{-2} \text{ days}$

$T_2 = \boxed{8.89 \times 10^2 \text{ gpd/ft}}$

$$S_1 = \frac{(0.3)(7.94 \times 10^2)(7.29 \times 10^{-2})}{(446.391)^2} = \boxed{8.71 \times 10^{-5}}$$

$$S_2 = \frac{(0.3)(8.89 \times 10^2)(7.29 \times 10^{-2})}{(446.391)^2} = \boxed{9.76 \times 10^{-5}}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD | JOB NO.: 2?5-14

SUBJECT: REI 2-4 Run #2 Calc for REI 11 | COMPUTED BY: DCG DATE: 11-?-?

CHECKED BY: DD DATE: 11-19-8?

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T_1 = \boxed{7.94 \times 10^2 \text{ gpd/ft}}$

$b = 16.45 \text{ ft}$

$K = \frac{7.94 \times 10^2}{16.45} = \boxed{4.83 \times 10^1 \text{ gpd/ft}^2}$

x Conversion Factor 4.715×10^{-5} $= \boxed{2.28 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{8.89 \times 10^2 \text{ gpd/ft}}$

$b = 16.45 \text{ ft}$

$K = \frac{8.89 \times 10^2}{16.45} = \boxed{5.41 \times 10^1 \text{ gpd/ft}^2}$

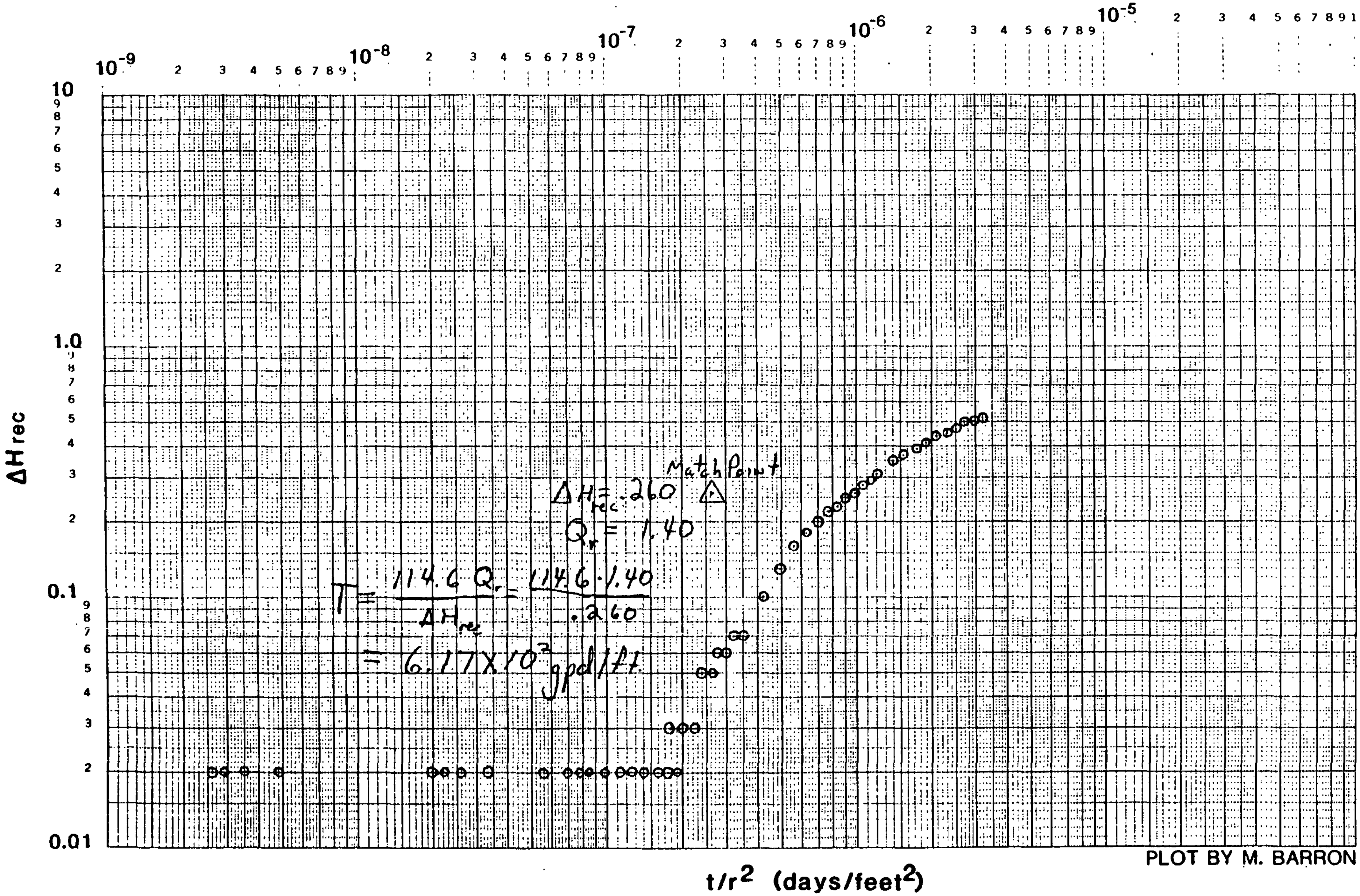
x Conversion Factor 4.715×10^{-5} $= \boxed{2.55 \times 10^{-3} \text{ cm/s}}$

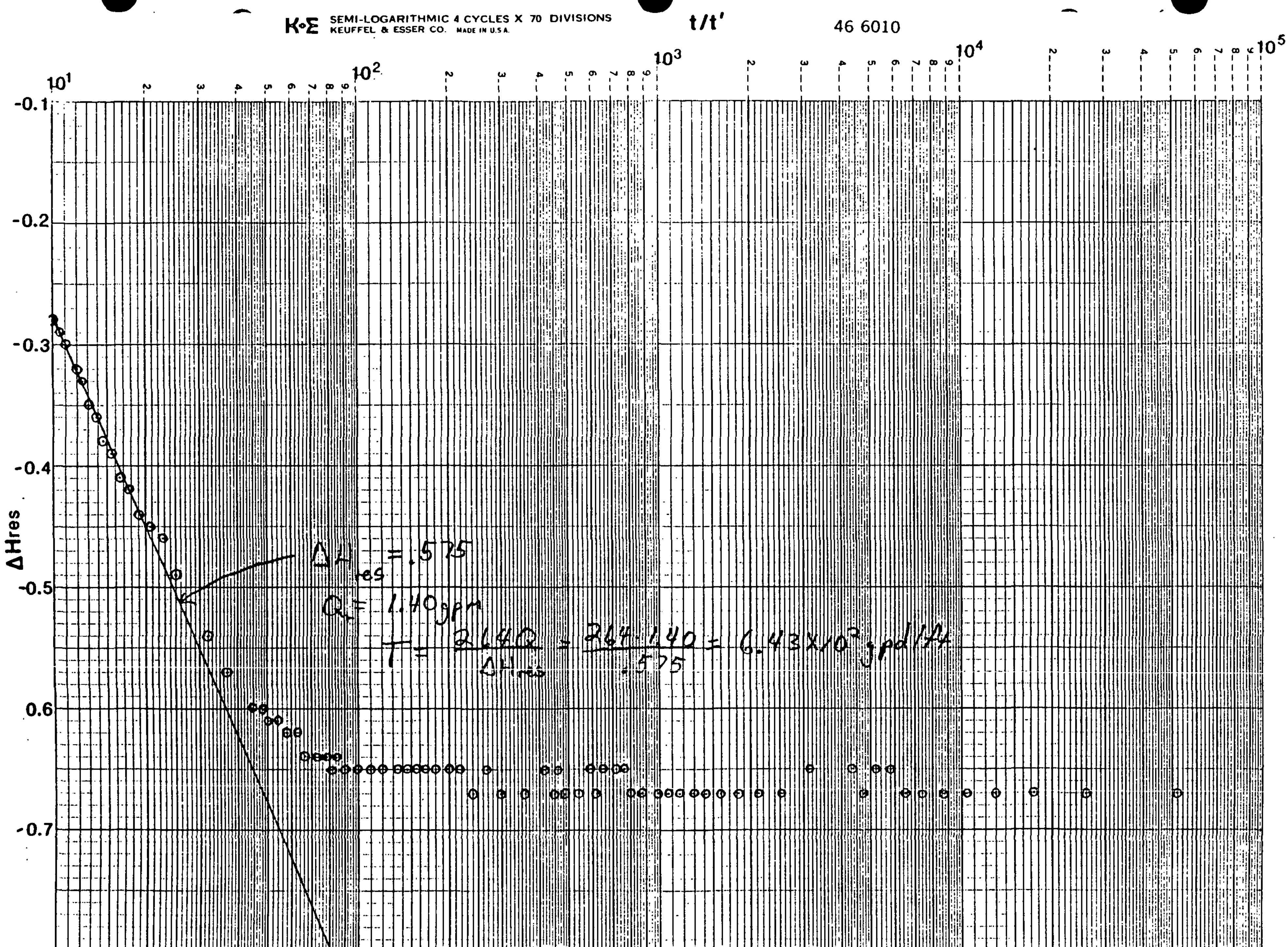
ERT

K&E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 7520

REI 3-4 RUN #2 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI-11 8/21/86



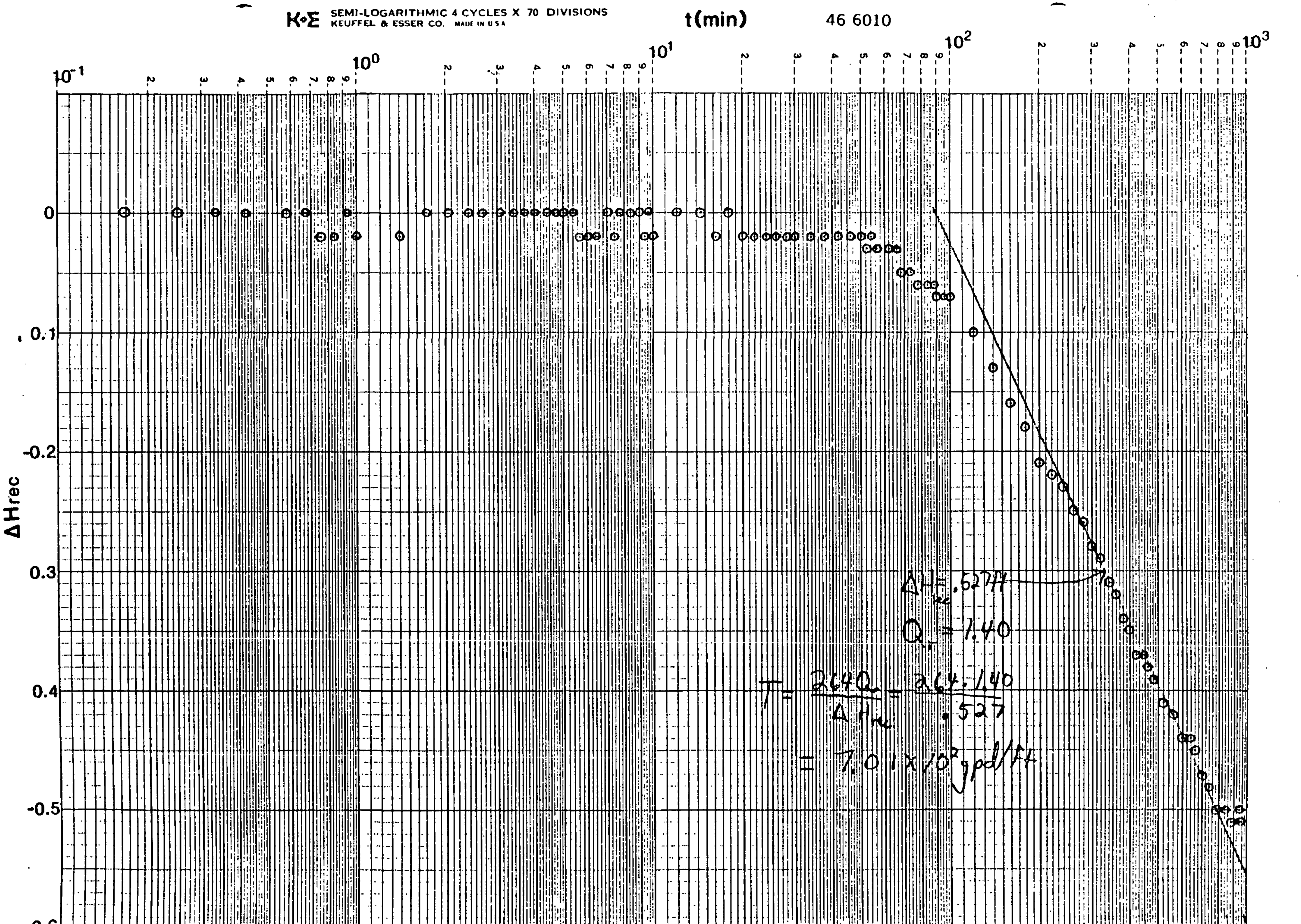


REI 3-4 RUN #2 PUMP TEST - RECOVERY

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI-11

8/21/86



REI 3-4 RUN #2 PUMP TEST - RECOVERY

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI-11

8/21/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd.

JOB NO.: 275-11

SUBJECT: RFI 3-4 Pump 2 Calc for RFI 11

COMPUTED BY: DRG DATE: 11-[illegible]

CHECKED BY: DD DATE: 11-19-86

$\boxed{\text{Log-Log solution for Transmissivity - Recovery}}$

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 0.260$ ft

$Q = 1.40$ gpm

$$T = \frac{(114.6)(1.40)}{0.260} = \boxed{6.17 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.432 \times 10^{-7} = \boxed{8.87 \times 10^{-5} \text{ m}^2/\text{s}}$$

$\boxed{\text{Solution for Hydraulic Conductivity - Recovery}}$

$$K = \frac{T}{b}$$ where b is the screened thickness in feet.

$T = \boxed{6.17 \times 10^{2} \text{ gpd/ft}}$

$b = 16.45$ ft

$$K = \frac{6.17 \times 10^{2}}{16.45} = \boxed{3.75 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.716 \times 10^{-5} \quad \boxed{1.77 \times 10^{-3} \text{ cm/s}}$$

$\boxed{\text{Semi-Log (a) solution for Transmissivity - Recovery}}$

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 1.40$ gpm

$\Delta H_{res} = 0.575$ ft

$$T = \frac{(264)(1.40)}{0.575} = \boxed{6.43 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.432 \times 10^{-7} = \boxed{9.21 \times 10^{-5} \text{ m}^2/\text{s}}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd

JOB NO.: 27?-16

SUBJECT: REI 3-4 Run #2 Calc for REI 11

COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: DD DATE: 11-1986

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{6.43 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{6.43 \times 10^2}{16.45} = \boxed{3.91 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} = $\boxed{1.84 \times 10^{-3} \text{ cm/s}}$

Semi-Log (b) solution for Transmissivity - Recovery

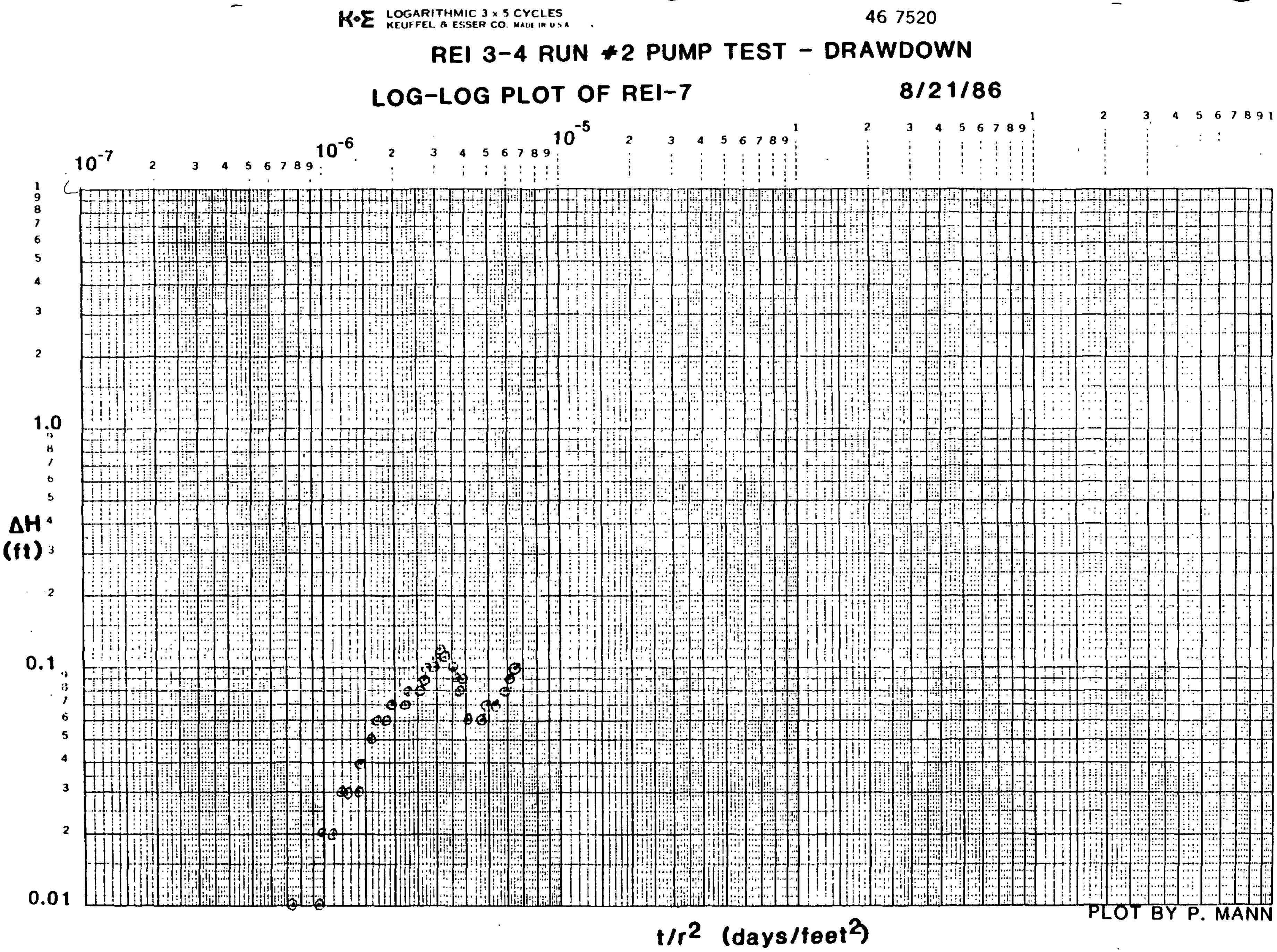
Transmissivity (T) - $\frac{264 Q}{\Delta H_{rec}}$

$Q = 1.40$ gpm

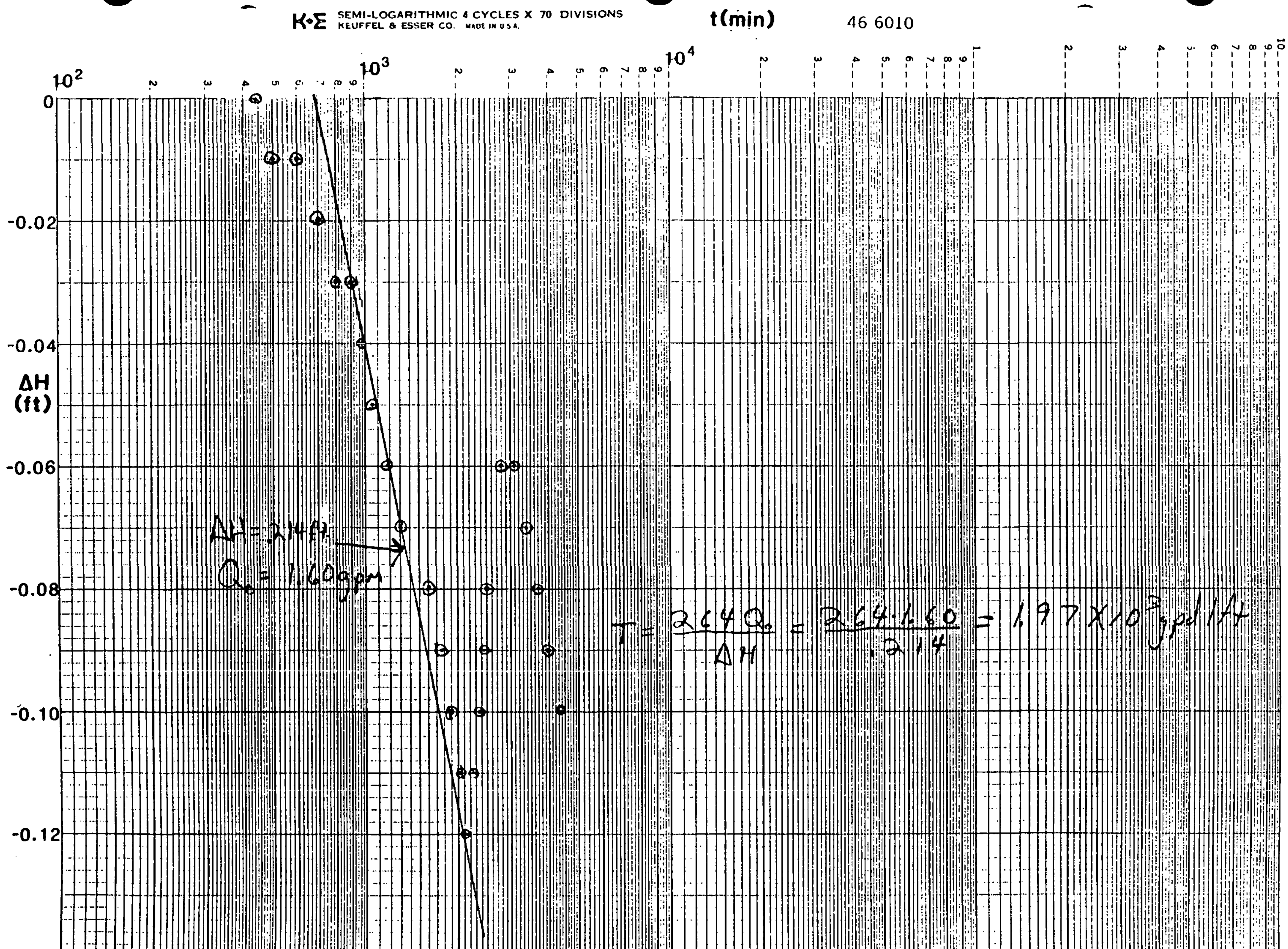
$\Delta H_{rec} = 0.527$ ft $\quad T = \frac{(264)(1.40)}{0.527} = \boxed{7.01 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{1.01 \times 10^{-4} \text{ m}^2\text{/s}}$

ERT



K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 7520
REI 3-4 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI-7
8/21/86
10^{-7}
10^{-6}
10^{-5}
1.0
0.1
0.01
ΔH (ft)
t/r² (days/feet²)
PLOT BY P. MANN



REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY S. CAYLOR

SEMI-LOG PLOT OF REI-7

8/21/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.   JOB NO.: 275-14

SUBJECT: REI 3-4 Run #2 Calc for REI 7   COMPUTED BY: DRG DATE: 11-12-
CHECKED BY: DD DATE: 11-15-8

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 1.60$ gpm

$\Delta H = 0.214$ ft $T = \frac{(264)(1.60)}{0.214} = \boxed{1.97 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} $= \boxed{2.84 \times 10^{-4} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_o}{r^2}$$

$r = 682.670$ ft

$t_o = 690 \text{ min}/1440 = 4.79 \times 10^{-1}$ days

$T = \boxed{1.97 \times 10^3 \text{ gpd/ft}}$

$$S = \frac{(0.3)(1.97 \times 10^3)(4.79 \times 10^{-1})}{(682.670)^2} = \boxed{6.07 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

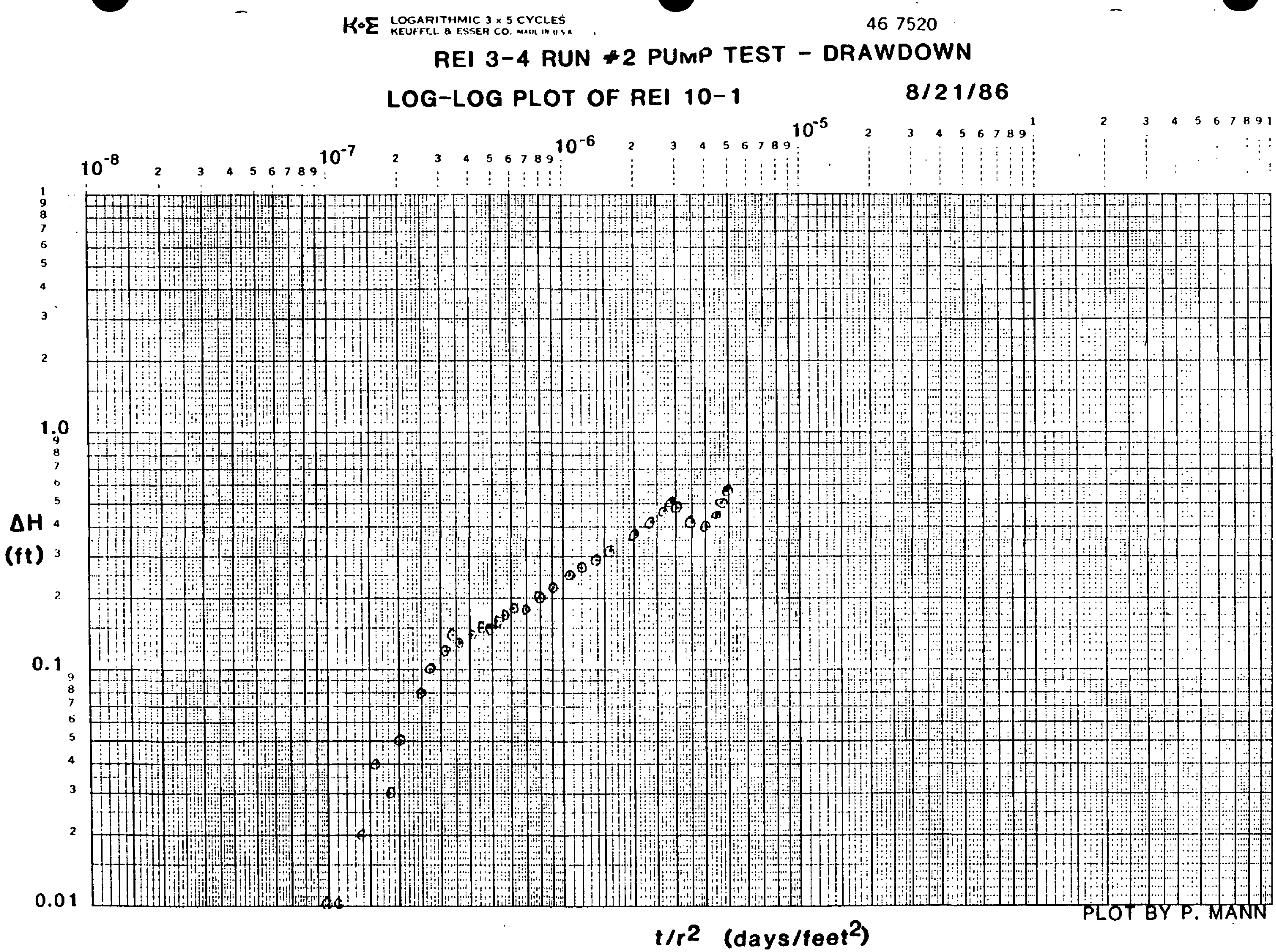
$T = \boxed{1.97 \times 10^3 \text{ gpd/ft}}$

$b = 15.0$ ft

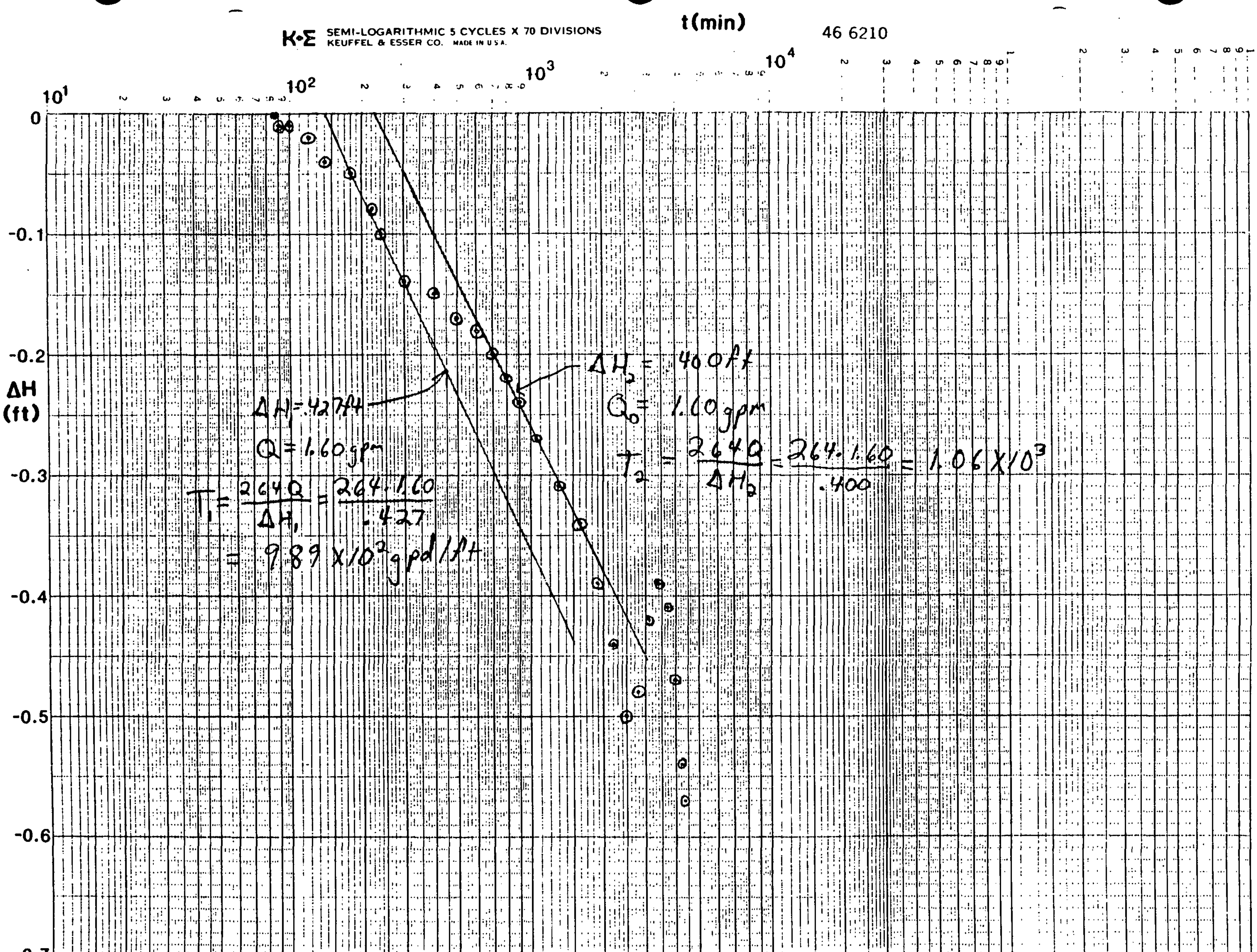
$$K = \frac{1.97 \times 10^3}{15.0} = \boxed{1.32 \times 10^2 \text{ gpd/ft}^2}$$

X Conversion Factor 4.715×10^{-5} $= \boxed{6.20 \times 10^{-3} \text{ cm/s}}$

ERT



K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 7520
REI 3-4 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 10-1
8/21/86
ΔH (ft)
1.0
0.1
0.01
10^-8
10^-7
10^-6
10^-5
t/r^2 (days/feet^2)
PLOT BY P. MANN



REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY S. CAYLOR

SEMI-LOG PLOT OF REI 10 - 1 8/21/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd. JOB NO.: [illegible]

SUBJECT: REI 3-4 Run #2 Calc. for REI 10-1

COMPUTED BY: DKG DATE: 11-17-[illegible]

CHECKED BY: DD DATE: 11-19-96

Semi-Log solution for Transmissivity – Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 1.60$ gpm

$\Delta H_1 = 0.427$ ft $\quad T_1 = \frac{(264)(1.60)}{0.427} = \boxed{9.89 \times 10^2 \text{ gpd/ft}}$

$\Delta H_2 = 0.400$ ft $\quad T_2 = \frac{(264)(1.60)}{0.400} = \boxed{1.06 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} = $\boxed{1.42 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{1.52 \times 10^{-4} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity – Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_o}{r^2}$$

$r = 784.360$ ft

$t_{o_1} = 140 \text{ min}/1440 = 9.72 \times 10^{-2}$ days

$T_1 = \boxed{9.89 \times 10^2 \text{ gpd/ft}}$

$t_{o_2} = 225 \text{ min}/1440 = 1.56 \times 10^{-1}$ days

$T_2 = \boxed{1.06 \times 10^3 \text{ gpd/ft}}$

$$S_1 = \frac{(0.3)(9.89 \times 10^2)(9.72 \times 10^{-2})}{(784.360)^2} = \boxed{4.69 \times 10^{-5}}$$

$$S_2 = \frac{(0.3)(1.06 \times 10^3)(1.56 \times 10^{-1})}{(784.360)^2} = \boxed{8.06 \times 10^{-5}}$$

ERT

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: French Ltd JOB NO.: [illegible]

SUBJECT: REI 2-11 Run #2 Calc for REI 10-1

COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: DD DATE: 11-19-8[illegible]

Solutions for Hydraulic Conductivity (K)

$$K = \frac{T}{b}$$ where b is the screened thickness in feet

$T_1 = \boxed{9.89 \times 10^2 \text{ gpd/ft}}$

$b = 25.30$ ft

$$K = \frac{9.89 \times 10^2}{25.30} = \boxed{3.91 \times 10^1 \text{ gpd/ft}^2}$$

X Conversion Factor 4.716×10^{-5} = $\boxed{1.84 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{1.06 \times 10^3 \text{ gpd/ft}}$

$b = 25.30$ ft

$$K = \frac{1.06 \times 10^3}{25.30} = \boxed{4.17 \times 10^1 \text{ gpd/ft}^2}$$

X Conversion Factor 4.716×10^{-5} = $\boxed{1.97 \times 10^{-3} \text{ cm/s}}$

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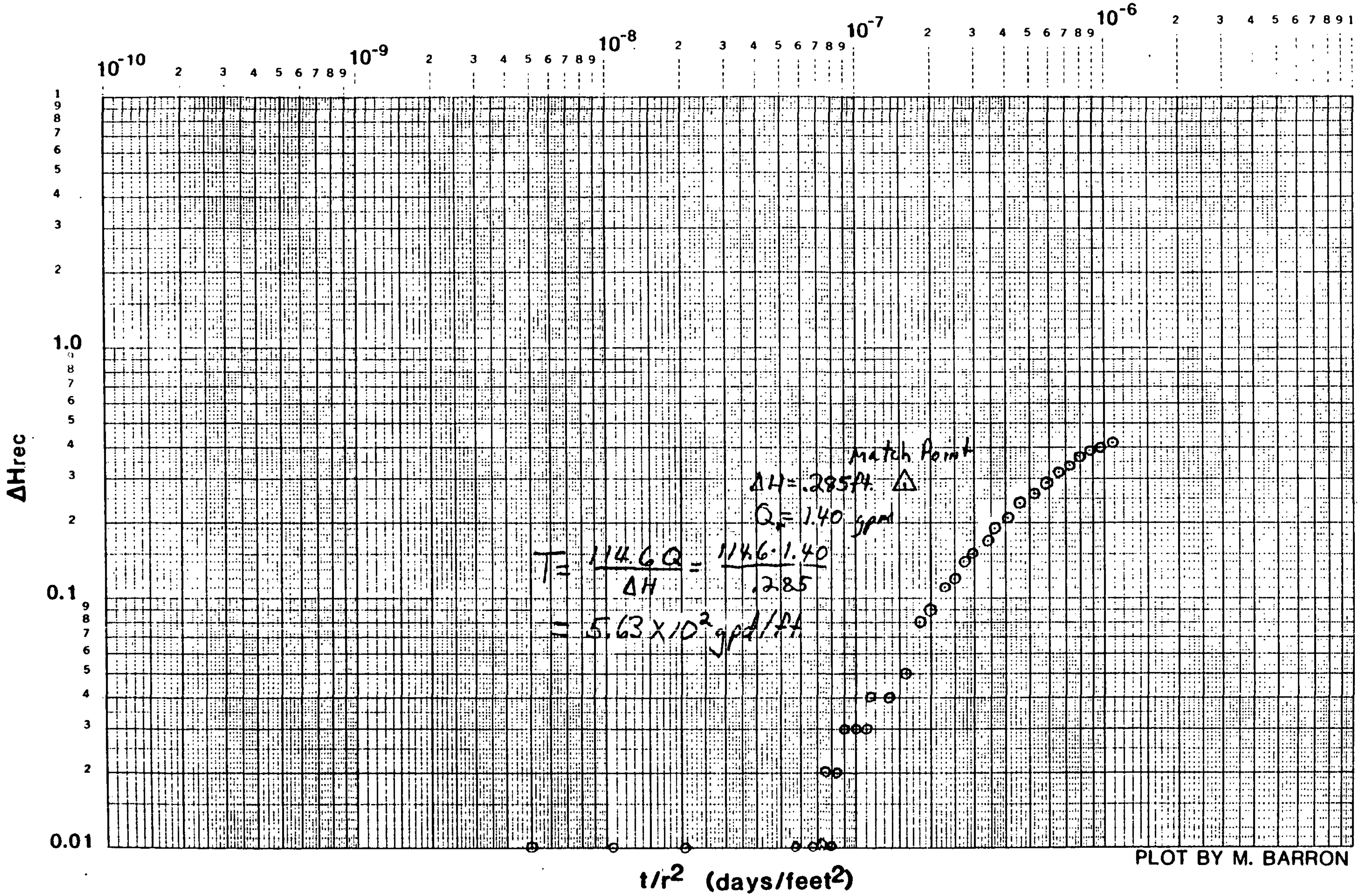
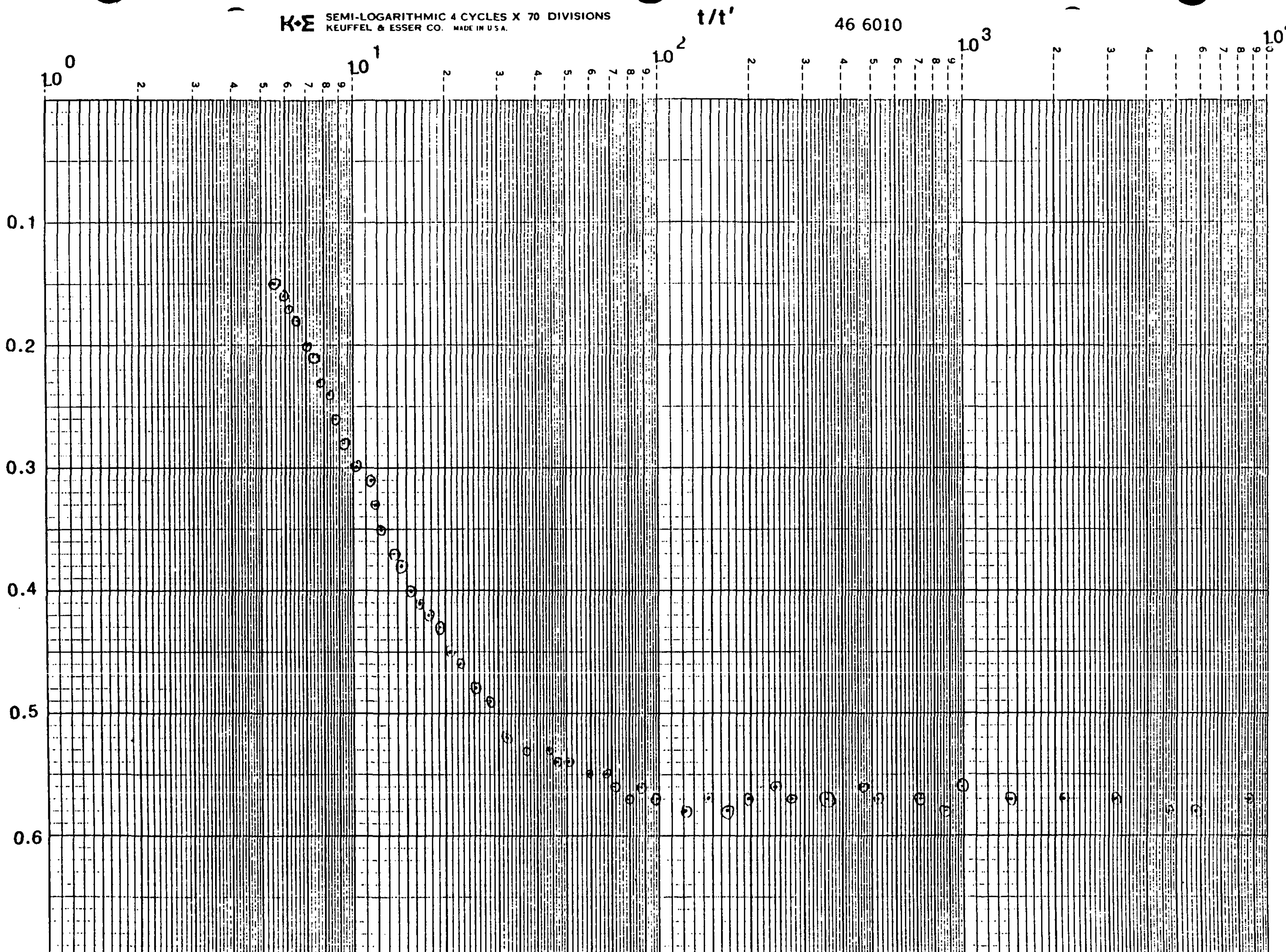
46 7520

REI 3-4 RUN #2 PUMP TEST - RECOVERY
LOG-LOG PLOT OF REI 10-1 8/21/86

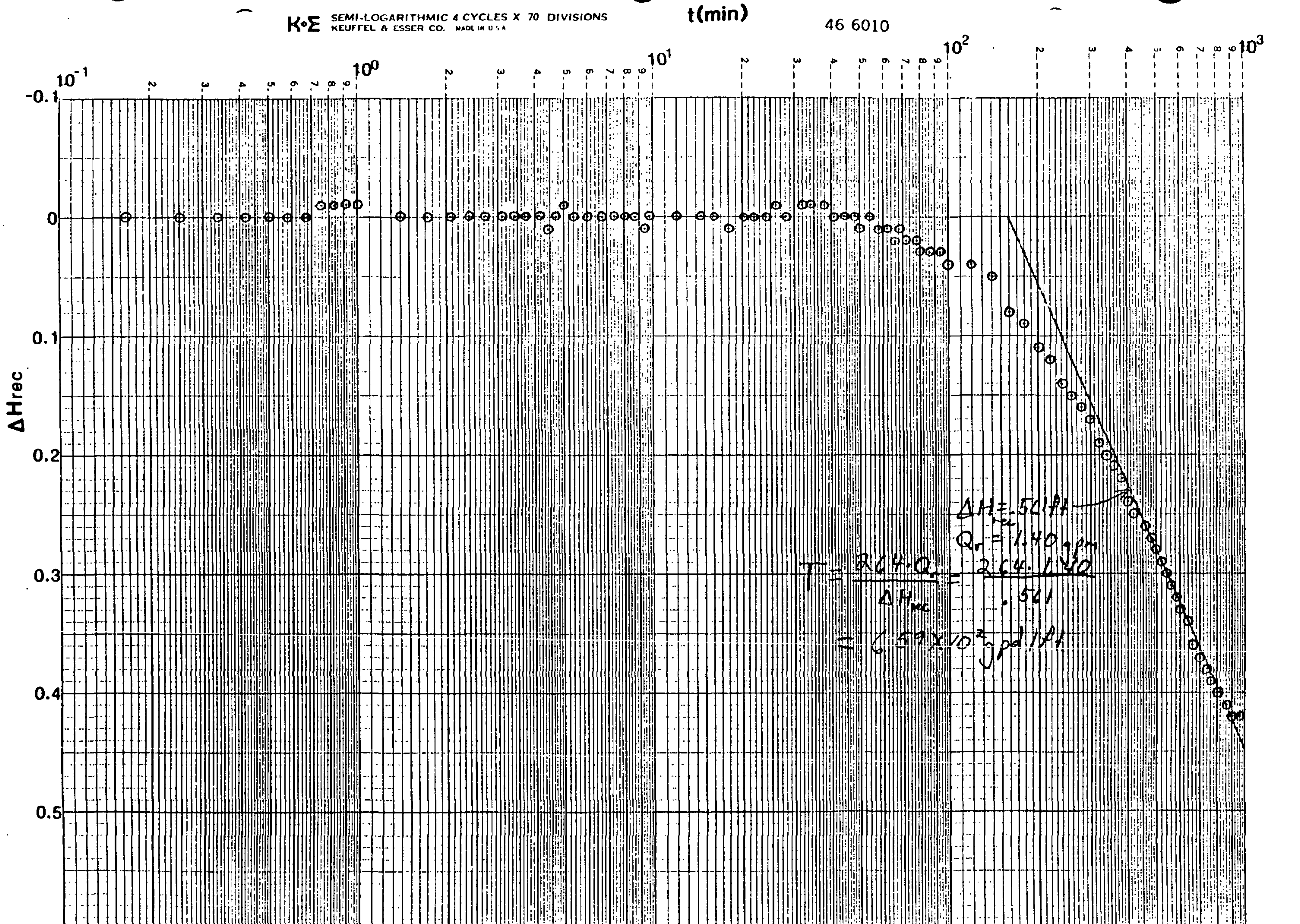


PLOT BY M. BARRON



REI 3-4 RUN # 2 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF REI 10-1 8/21/86



REI 3-4 RUN #2 PUMP TEST - RECOVERY PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 10-1 8/21/86

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: FRENCH LTD — JOB NO.: 275-16

SUBJECT: REI 3-4 Run #2 Calc for REI 10-1 — COMPUTED BY: DCS DATE: 10-... — CHECKED BY: DD DATE: 11-19-86

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 0.285$ ft
$Q = 1.40$ gpm

$$T = \frac{(114.6)(1.40)}{0.285} = \boxed{5.63 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{8.10 \times 10^{-5} \text{ m}^2\text{/s}}$$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{5.63 \times 10^{2} \text{ gpd/ft}}$

$b = 25.30$ ft

$$K = \frac{5.63 \times 10^{2}}{25.30} = \boxed{2.23 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} \quad \boxed{1.05 \times 10^{-3} \text{ cm/s}}$$

Semi-Log(a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 1.40$ gpm
$\Delta H_{res} = 0.582$ ft

$$T = \frac{(264)(1.40)}{0.582} = \boxed{6.35 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{9.13 \times 10^{-5} \text{ m}^2\text{/s}}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: Frenos LTD

JOB NO.: 27?-14

SUBJECT: PEI 2-4 Run #2 Calc for REI 10-1

COMPUTED BY: DPS DATE: [illegible]

CHECKED BY: DD DATE: 11-?-86

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{6.35 \times 10^2 \text{ gpd/ft}}$

$b = 25.30$ ft

$K = \frac{6.35 \times 10^2}{25.30} = \boxed{2.51 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor 4.715×10^{-5} $= \boxed{1.18 \times 10^{-3} \text{ cm/s}}$

Semi-Log (t) solution for Transmissivity - Recovery

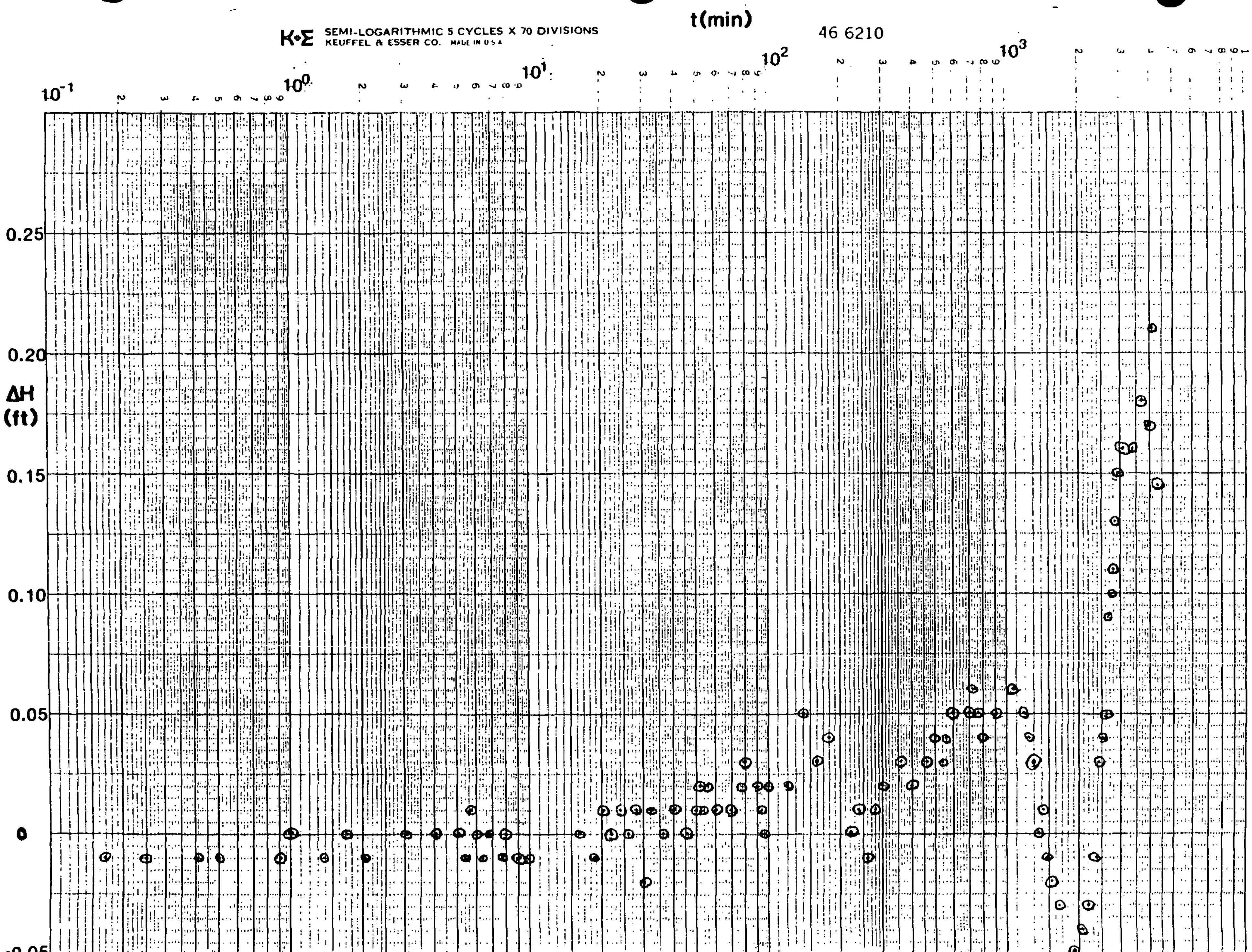
Transmissivity $(T) = \frac{264Q}{\Delta H_{rec}}$

$Q = 1.40$ gpm

$\Delta H_{rec} = 0.561$ ft $T = \frac{(264)(1.40)}{0.561} = \boxed{6.59 \times 10^2 \text{ gpd/ft}}$

$\times$ Conversion Factor 1.438×10^{-7} $= \boxed{9.47 \times 10^{-5} \text{ m}^2\text{/s}}$

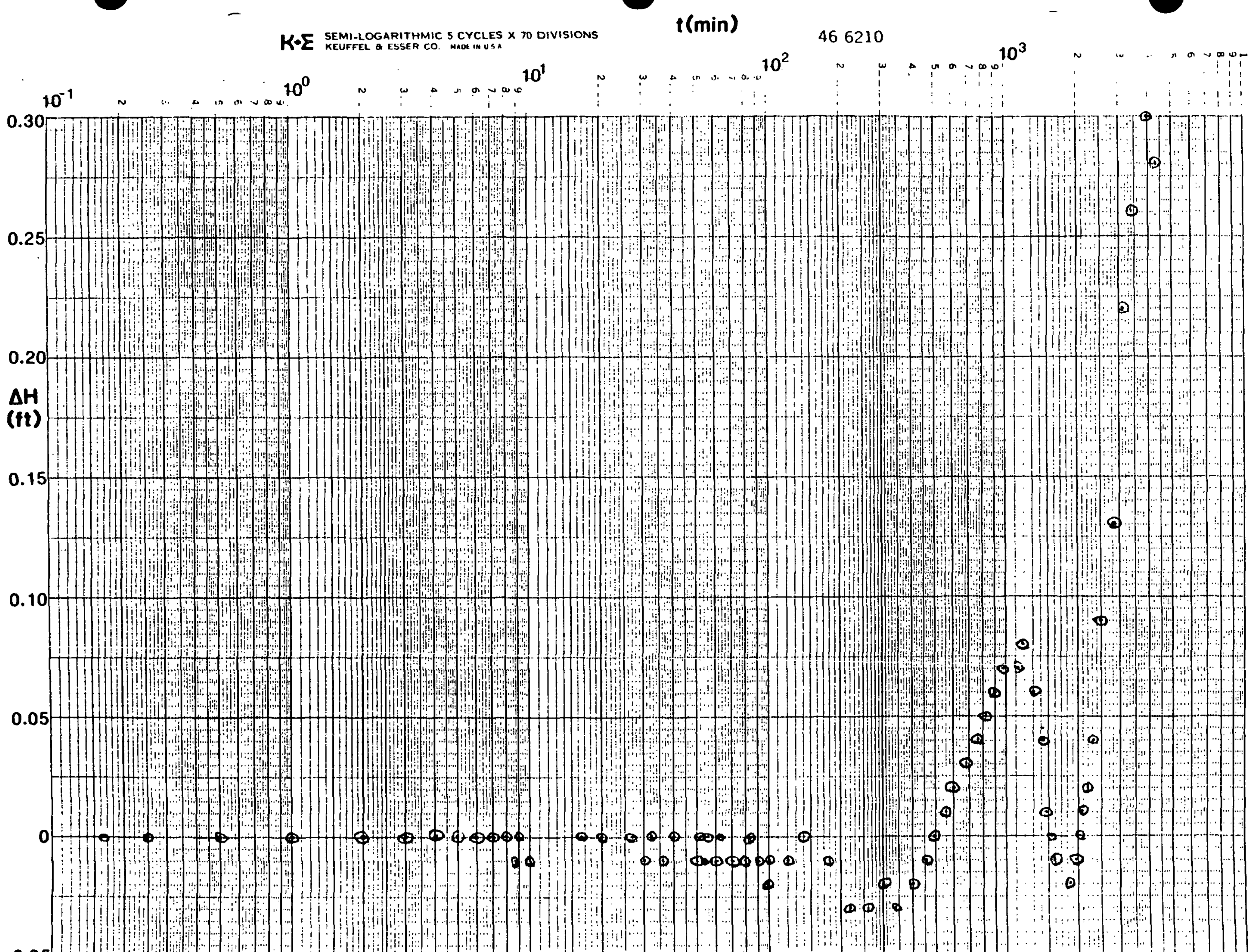
ERT



REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY S. CAYLOR

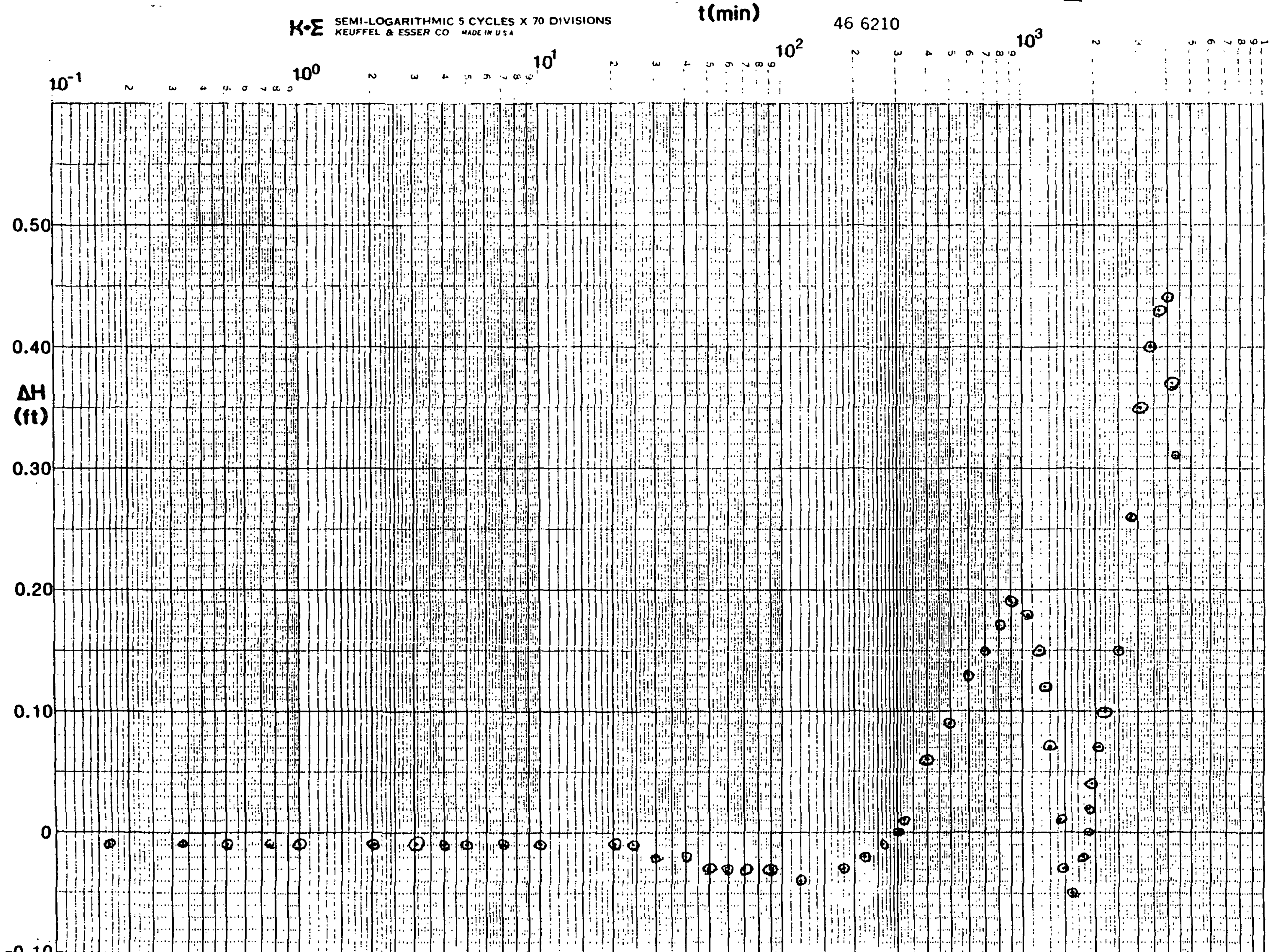
SEMI-LOG PLOT OF REI 3-1 8/21/86



REI 3-4 RUN #2 PUMP TEST – DRAWDOWN

SEMI-LOG PLOT OF REI 3-2 8/21/86

PLOT BY S. CAYLOR



REI 3-4 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY S. CAYLOR

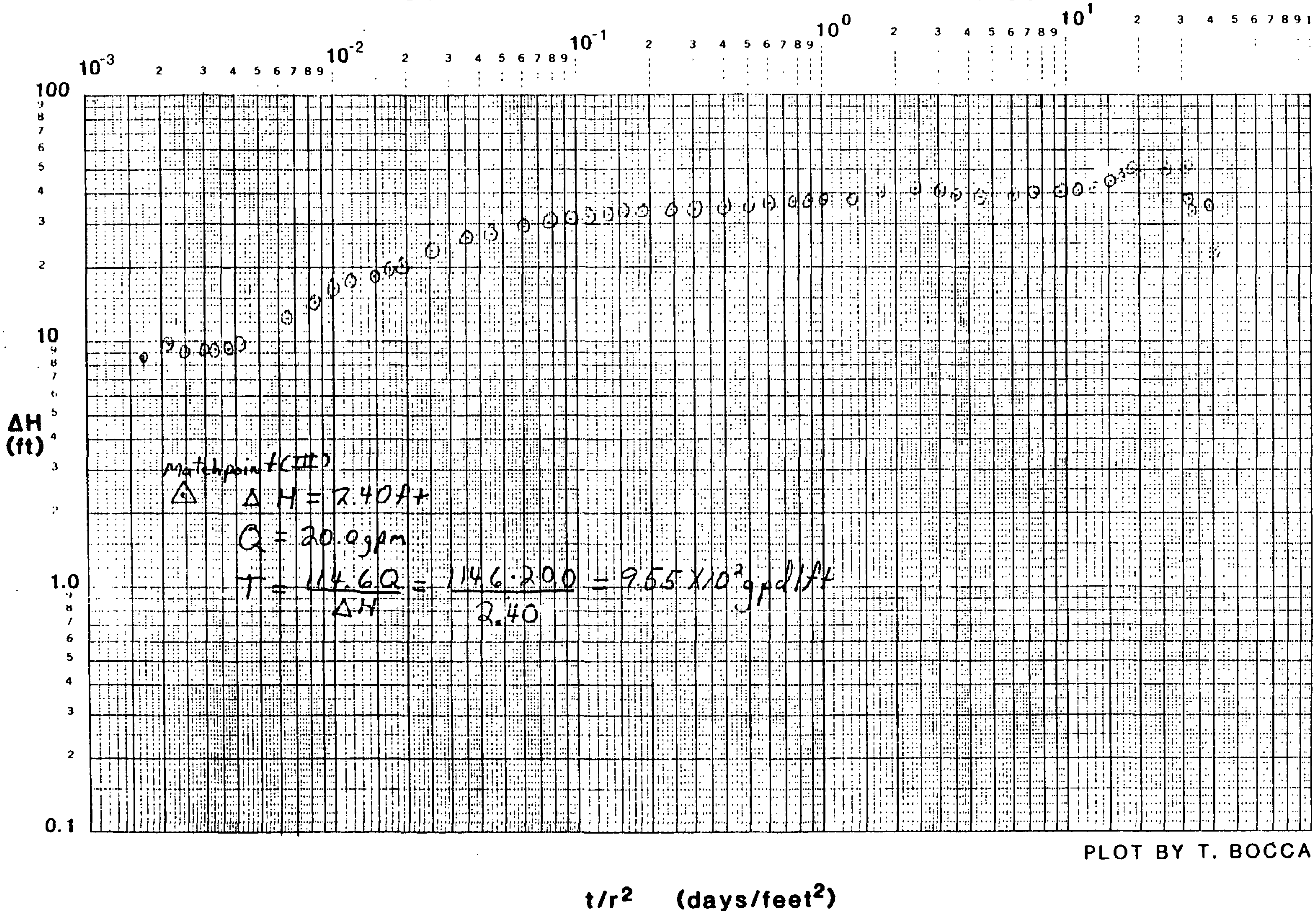
SEMI-LOG PLOT OF REI 3-3 8/21/86

Attachment 6

REI 10-1 Run #1 Pumping Test Response Curves and Aquifer Characteristics Calculations

K+E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7520

REI 10-1 RUN #1 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 10-1 9/15/86



CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD — JOB NO.: 271-14

SUBJECT: REI 10-1 Run #1 Calc. for REI 10-1 — COMPUTED BY: DCS DATE: 11/1/8?

CHECKED BY: DD DATE: 11/1/8?

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 2.40$ ft $\quad T = \frac{(114.6)(20.0)}{2.40} = \boxed{9.55 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{1.37 \times 10^{-4} \text{ m}^2/\text{s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 2.42 \times 10^{-7}$ days/ft²

$T = \boxed{9.55 \times 10^2 \text{ gpd/ft}}$

$S = \frac{(1)(9.55 \times 10^2)(2.42 \times 10^{-7})}{1.87} = \boxed{1.24 \times 10^{-4}}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

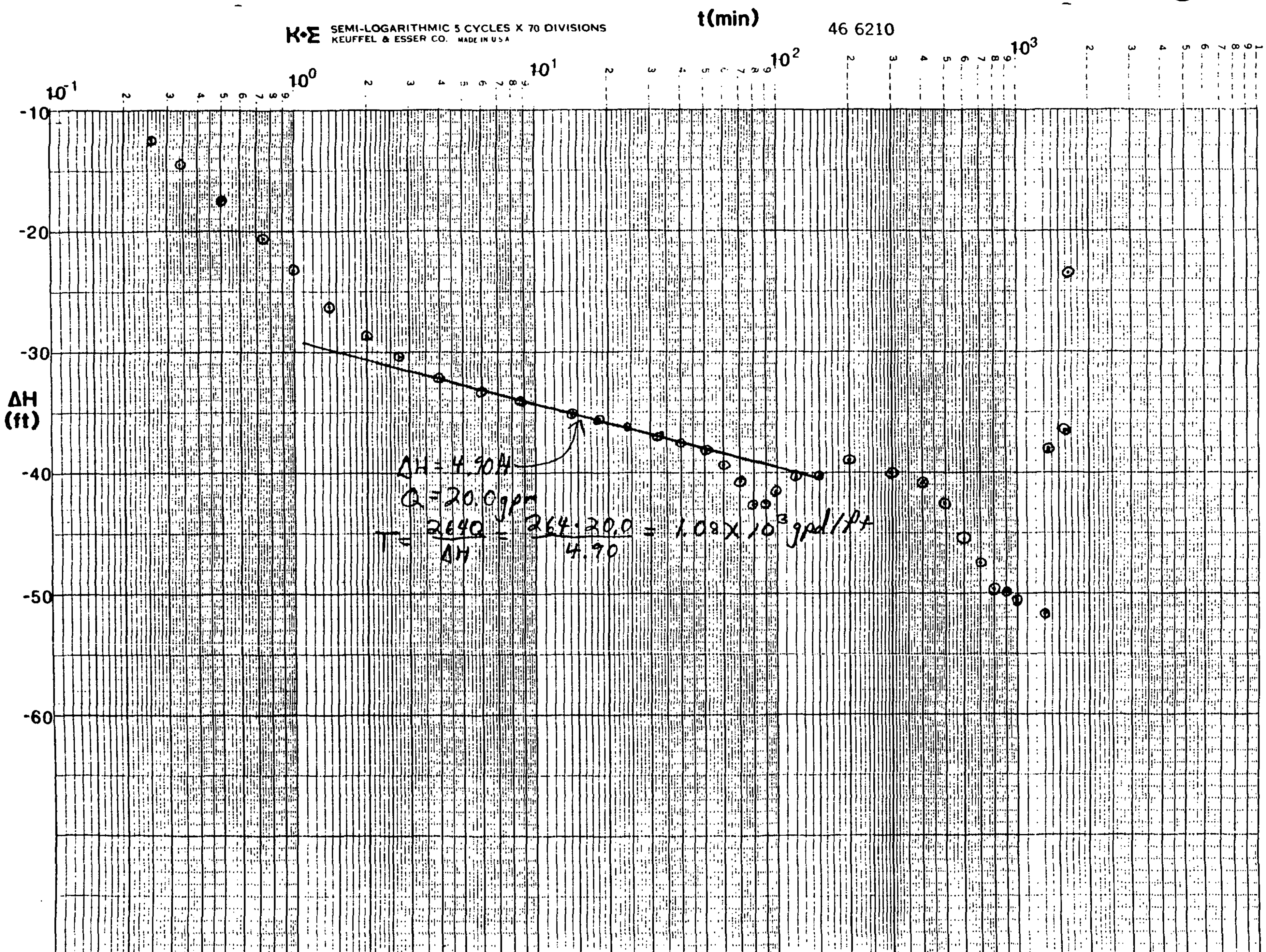
$T = \boxed{9.55 \times 10^2 \text{ gpd/ft}}$

$b = 25.30$ ft

$K = \frac{9.55 \times 10^2}{25.30} = \boxed{3.77 \times 10 \text{ gpd/ft}^2}$

x Conversion Factor 4.715×10^{-5} = $\boxed{1.78 \times 10^{-3} \text{ cm/s}}$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 10-1 9/15/86

PLOT BY T. BOCCA

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Pur #1 Calc for REI 10-1

COMPUTED BY: DRG DATE: 11-8-..

CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H = 4.90$ ft $\quad T = \frac{(264)(20.0)}{4.90} = \boxed{1.08 \times 10^3 \text{ gpd/ft}}$

$\times$ Conversion Factor $1.438 \times 10^{-7} = \boxed{1.55 \times 10^{-4} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T\,t_0}{r^2}$$

$r = 0.166$ ft

$t_0 = 2.35 \times 10^{-5}$ min. $/ 1440 = 1.63 \times 10^{-8}$ days

$T = \boxed{1.08 \times 10^3 \text{ gpd/ft}}$

$$S = \frac{(0.3)(1.08 \times 10^3)(1.63 \times 10^{-8})}{(0.166)^2} = \boxed{1.92 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{1.08 \times 10^3 \text{ gpd/ft}}$

$b = 25.30$ ft

$$K = \frac{1.08 \times 10^3}{25.30} = \boxed{4.26 \times 10^1 \text{ gpd/ft}^2}$$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{2.01 \times 10^{-3} \text{ cm/s}}$

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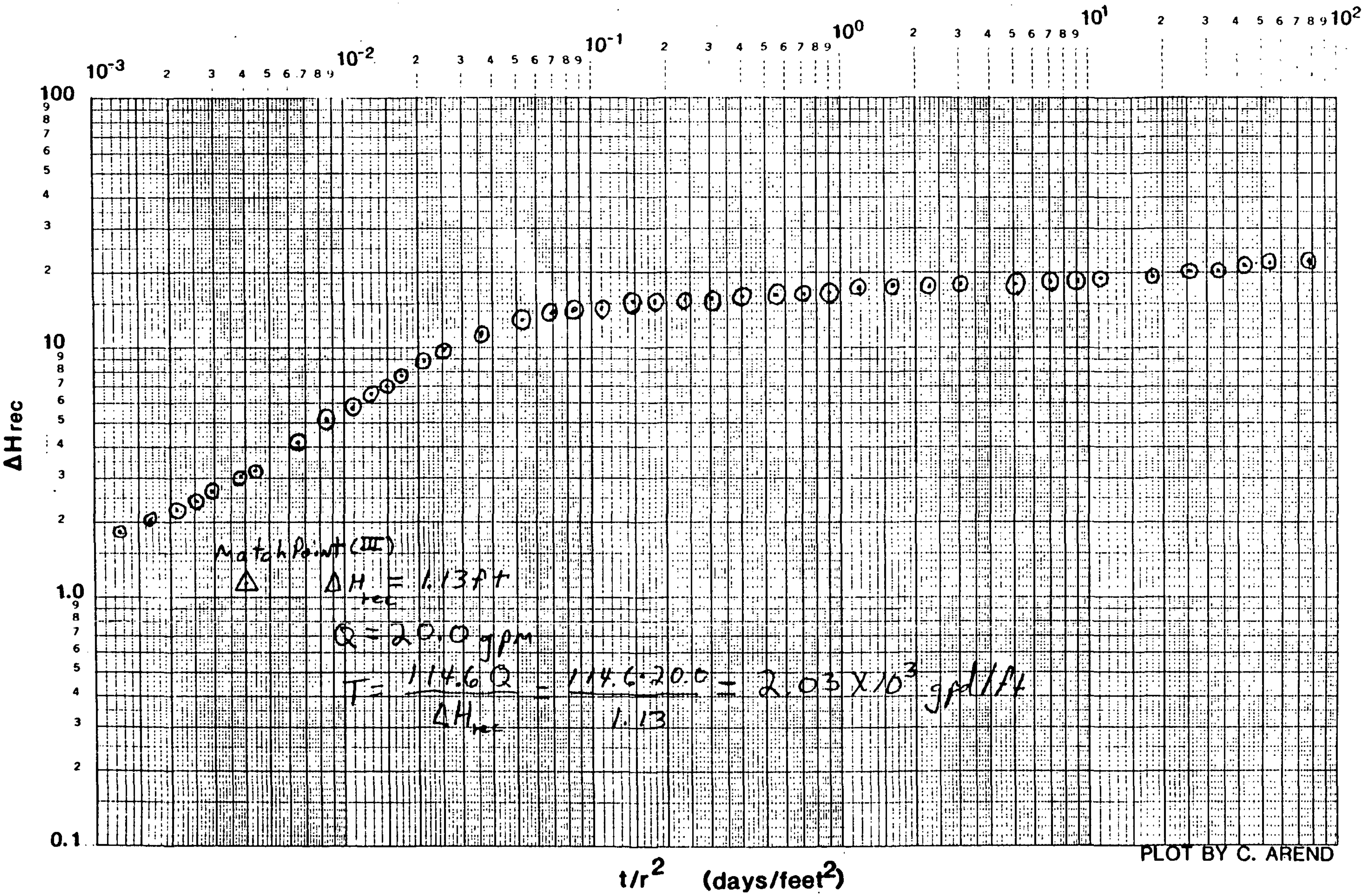
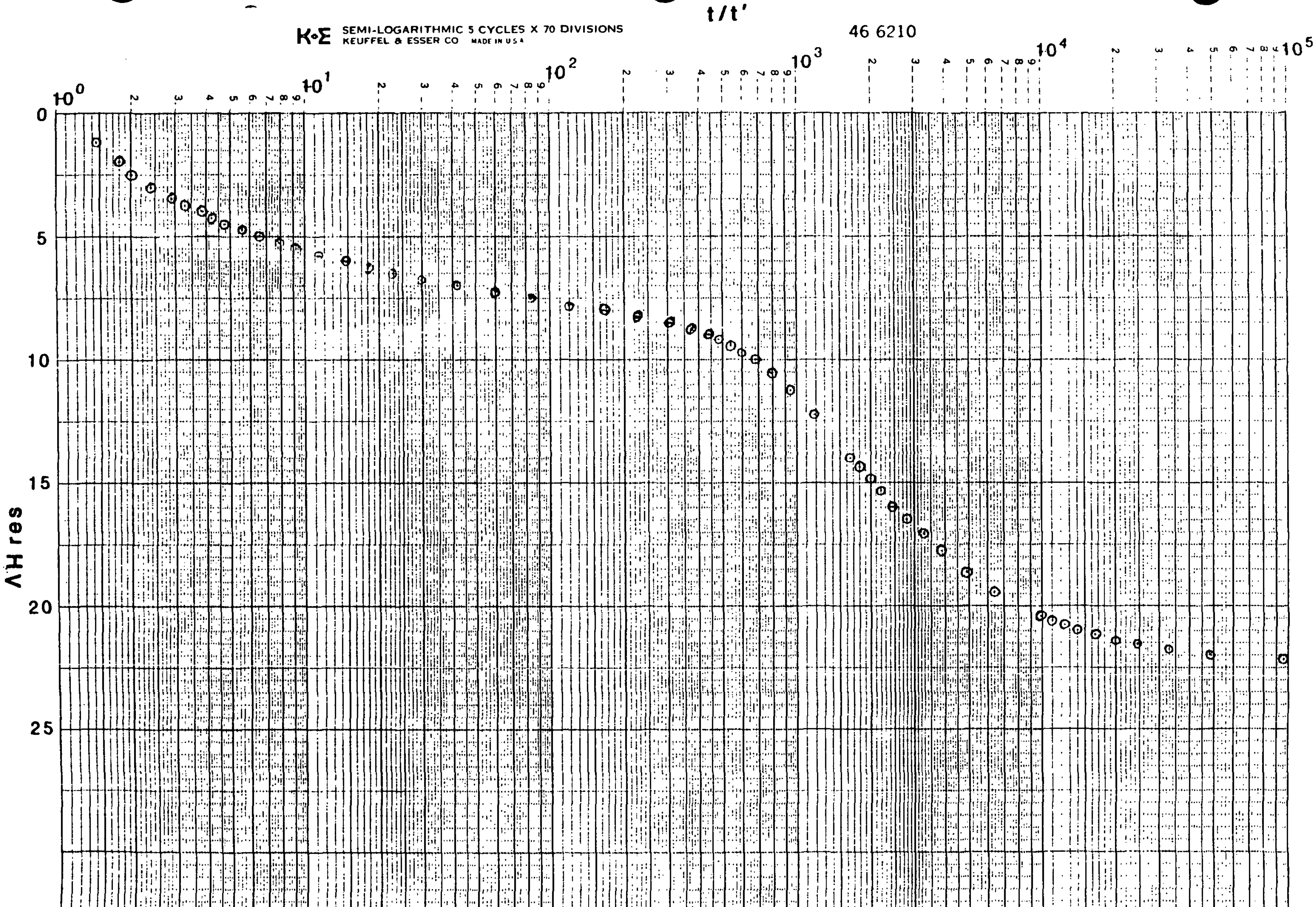
K•E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7520

REI 10-1 RUN #1 PUMP TEST - RECOVERY

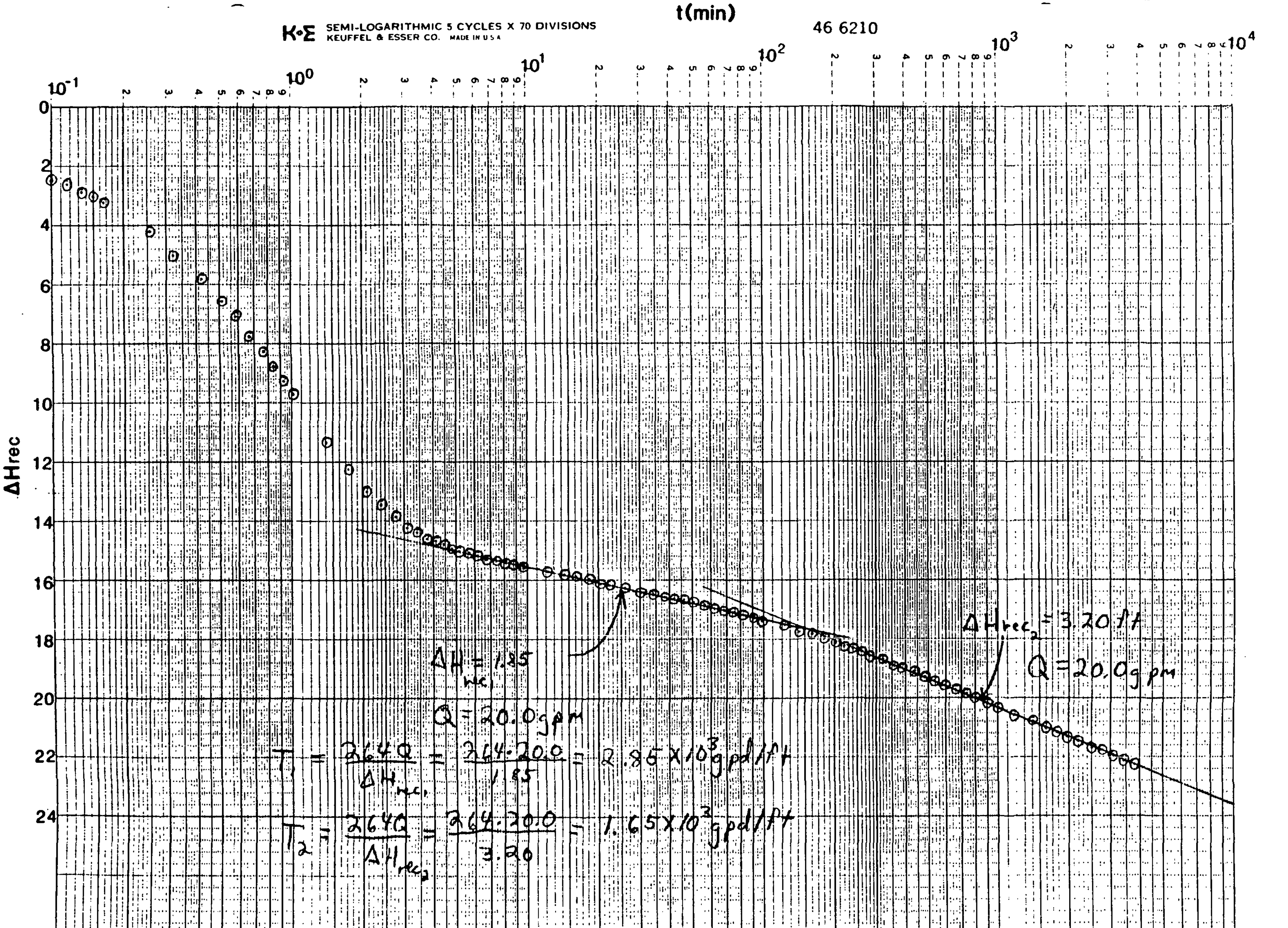
LOG-LOG PLOT OF REI 10-1 9/15/86





REI 10-1 RUN #1 PUMP TEST - RECOVERY PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 10-1 9/15/86



REI 10-1 RUN #1 PUMP TEST - RECOVERY

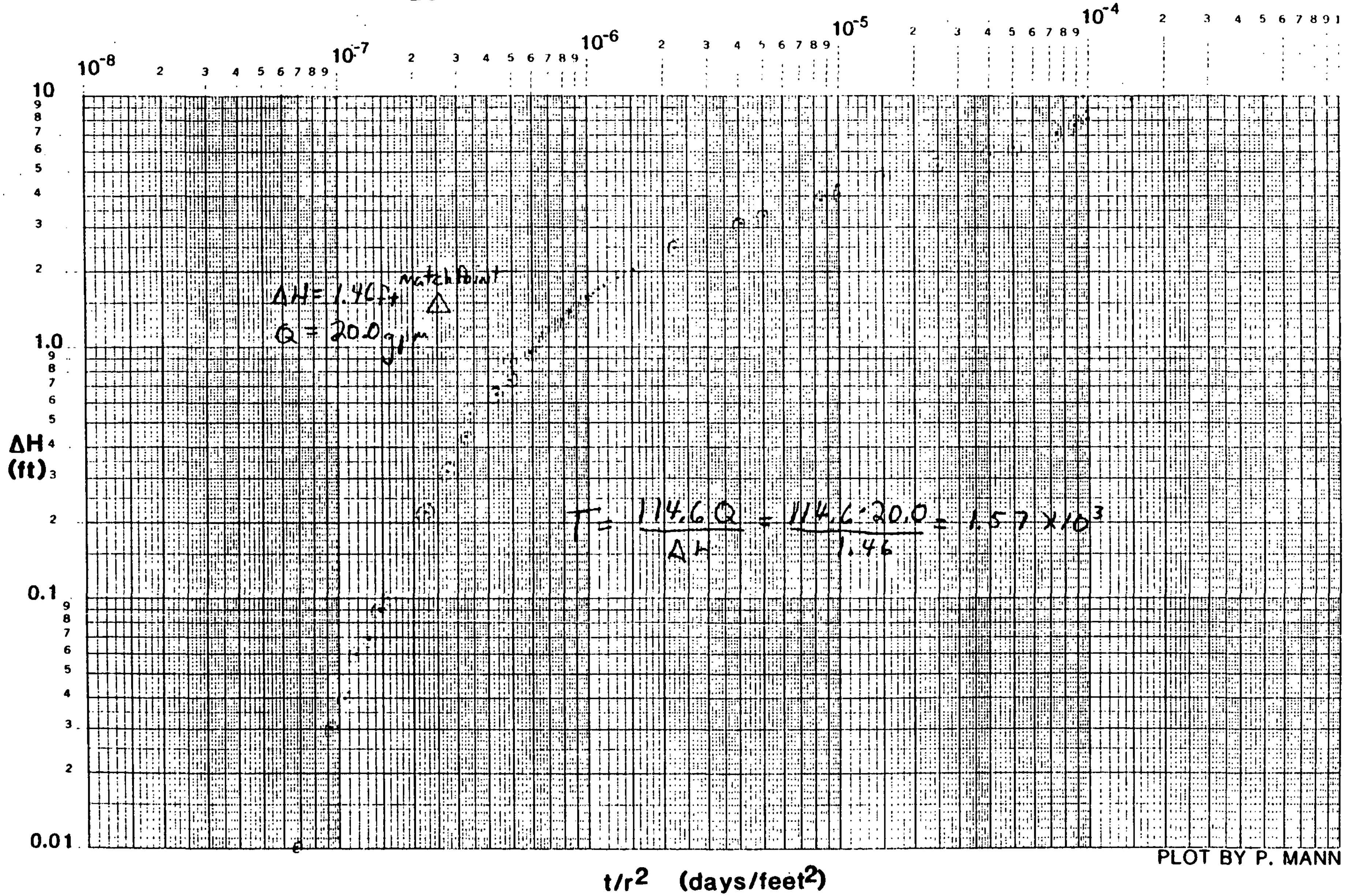
PLOT BY D. GABRYSCH

K•Σ LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF GW-25 9/15/86



PLOT BY P. MANN

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #1 Calc for GW-25

COMPUTED BY: DPS DATE: [illegible]

CHECKED BY: DD DATE: 11-19-84

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 1.46$ ft $\quad T = \dfrac{(114.6)(20.0)}{1.46}$ $\quad \boxed{1.57 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} = $\boxed{2.25 \times 10^{-4} \text{ m}^2\text{/s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 2.50 \times 10^{-7}$ days/ft²

$T = \boxed{1.57 \times 10^3 \text{ gpd/ft}}$

$$S = \frac{(1)(1.57 \times 10^3)(2.50 \times 10^{-7})}{1.87} = \boxed{2.10 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \dfrac{T}{b}$ where b is the screened thickness in feet

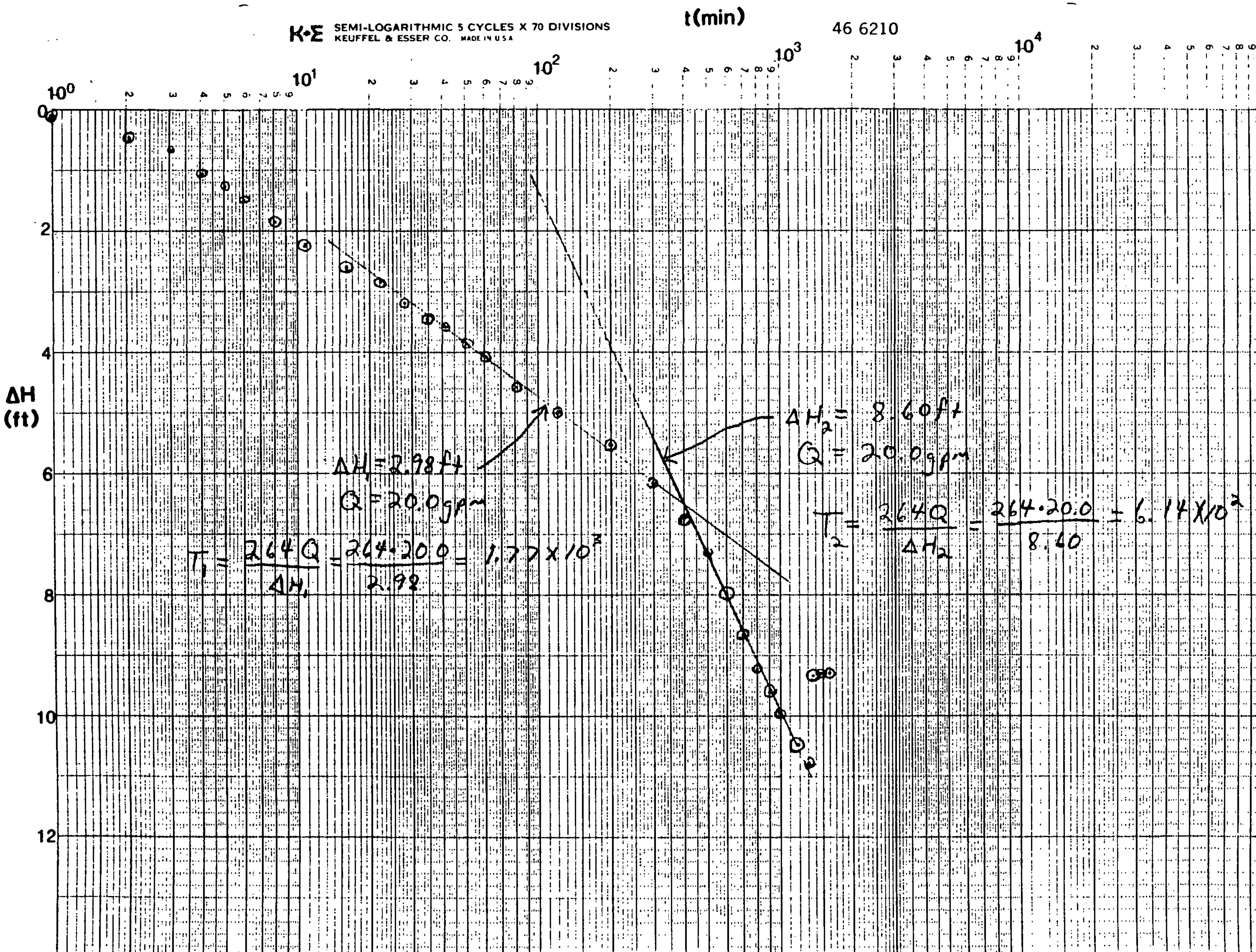
$T = \boxed{1.57 \times 10^3 \text{ gpd/ft}}$

$b = 5.0$ ft

$$K = \frac{1.57 \times 10^3}{5.0} = \boxed{3.14 \times 10^2 \text{ gpd/ft}^2}$$

X Conversion Factor 4.715×10^{-5} = $\boxed{1.48 \times 10^{-2} \text{ cm/s}}$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

PLOT BY S. CAYLOR

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: FRENCH LTD. JOB NO.: 224-14

SUBJECT: REI 10-1 Run #1 Calc. for GW-25

COMPUTED BY: DRG DATE: 11-19-86

CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H_1 = 2.98$ ft $\quad T_1 = \frac{(264)(20.0)}{2.98}$ $\quad \boxed{1.77 \times 10^3 \text{ gpd/ft}}$

$\Delta H_2 = 8.60$ ft $\quad T_2 = \frac{(264)(20.0)}{8.60}$ $\quad \boxed{6.14 \times 10^2 \text{ gpd/ft}}$

x Conversion Factor 1.438×10^{-7} = $\boxed{2.55 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{8.83 \times 10^{-5} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3Tt_0}{r^2}$$

$r = 66.670$ ft

$t_{0_1} = 2.5 \text{ min}/1440 = 1.74 \times 10^{-3}$ days

$T_1 = \boxed{1.77 \times 10^3 \text{ gpd/ft}}$

$t_{0_2} = 70 \text{ min}/1440 = 4.86 \times 10^{-2}$ days

$T_2 = \boxed{6.14 \times 10^2 \text{ gpd/ft}}$

$$S_1 = \frac{(0.3)(1.77 \times 10^3)(1.74 \times 10^{-3})}{(66.670)^2} = \boxed{2.08 \times 10^{-4}}$$

$$S_2 = \frac{(0.3)(6.14 \times 10^2)(4.86 \times 10^{-2})}{(66.670)^2} = \boxed{2.01 \times 10^{-3}}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FREMONT LTD. — JOB NO.: 27?-1?

SUBJECT: REI 10-1 Run #1 Calc. for GW-2S — COMPUTED BY: DRG DATE: 11-?-8?

CHECKED BY: DD DATE: 11-19-86

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T_1 = \boxed{1.77 \times 10^3 \text{ gpd/ft}}$

$b = 5.0 \text{ ft}$

$K = \frac{1.77 \times 10^3}{5.0} = \boxed{3.54 \times 10^2 \text{ gpd/ft}^2}$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{1.67 \times 10^{-2} \text{ cm/s}}$

$T_2 = \boxed{6.14 \times 10^2 \text{ gpd/ft}}$

$b = 5.0 \text{ ft}$

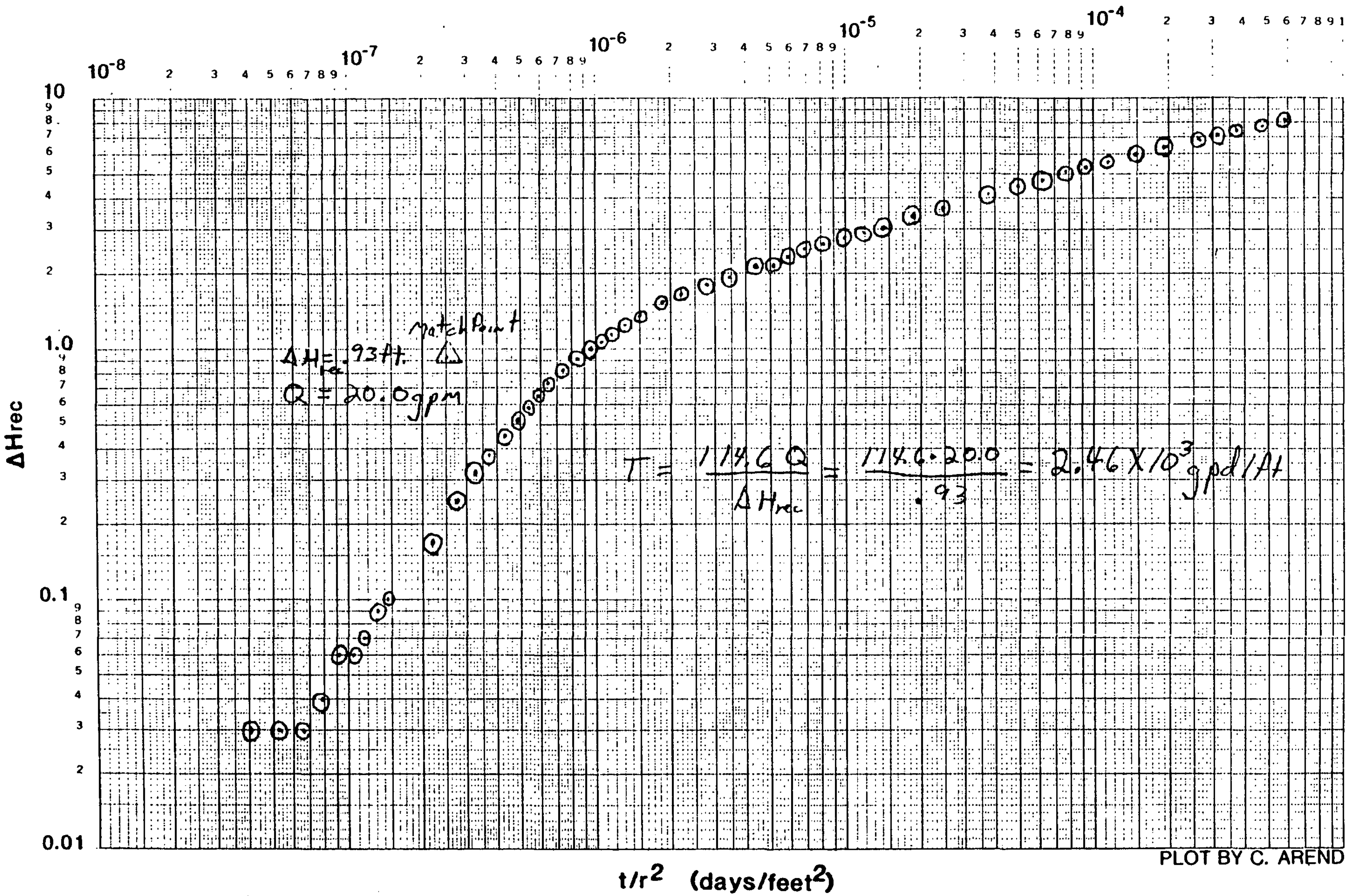
$K = \frac{6.14 \times 10^2}{5.0} = \boxed{1.23 \times 10^2 \text{ gpd/ft}^2}$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{5.79 \times 10^{-3} \text{ cm/s}}$

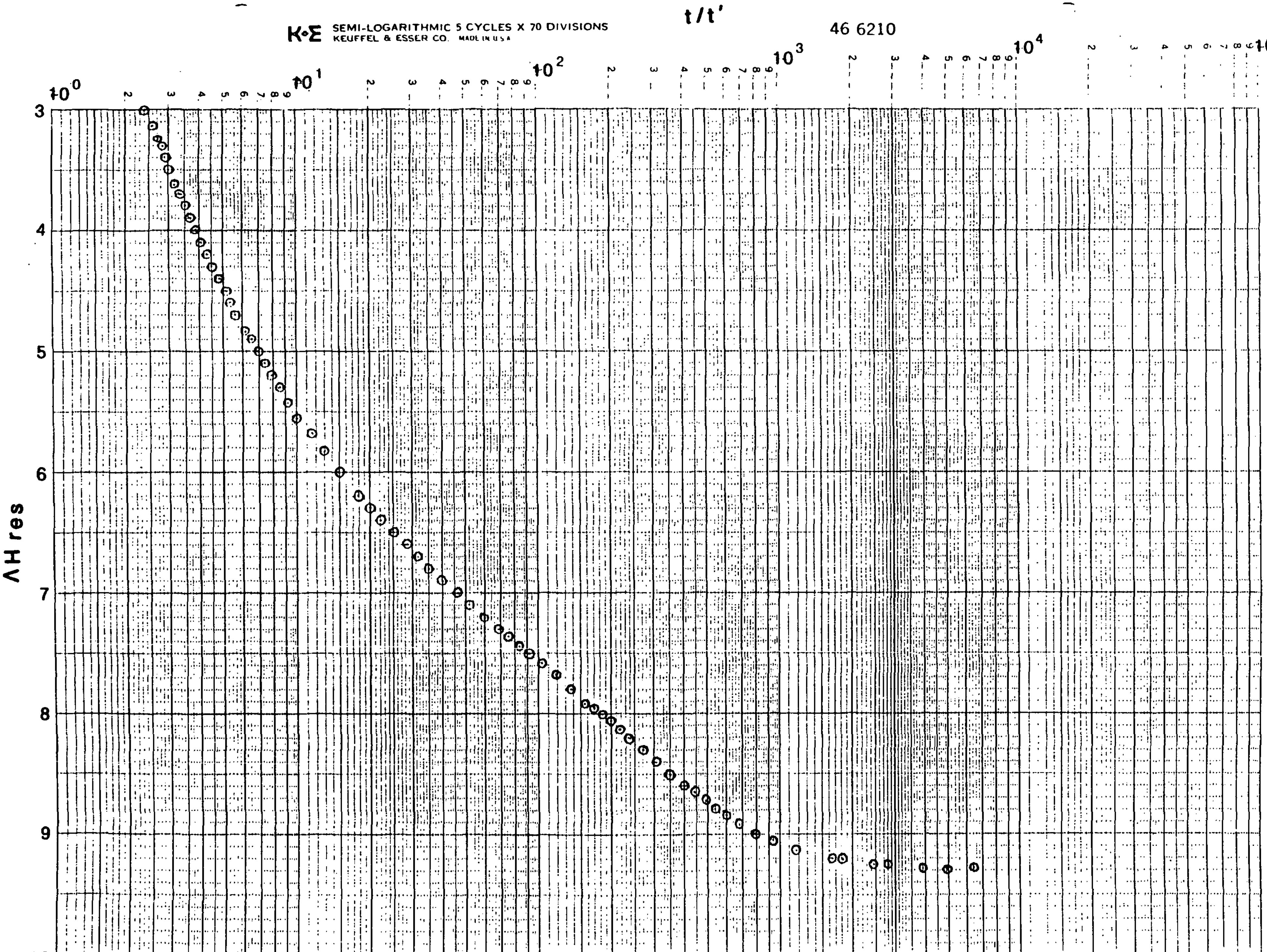
ERT

REI 10-1 RUN #1 PUMP TEST - RECOVERY

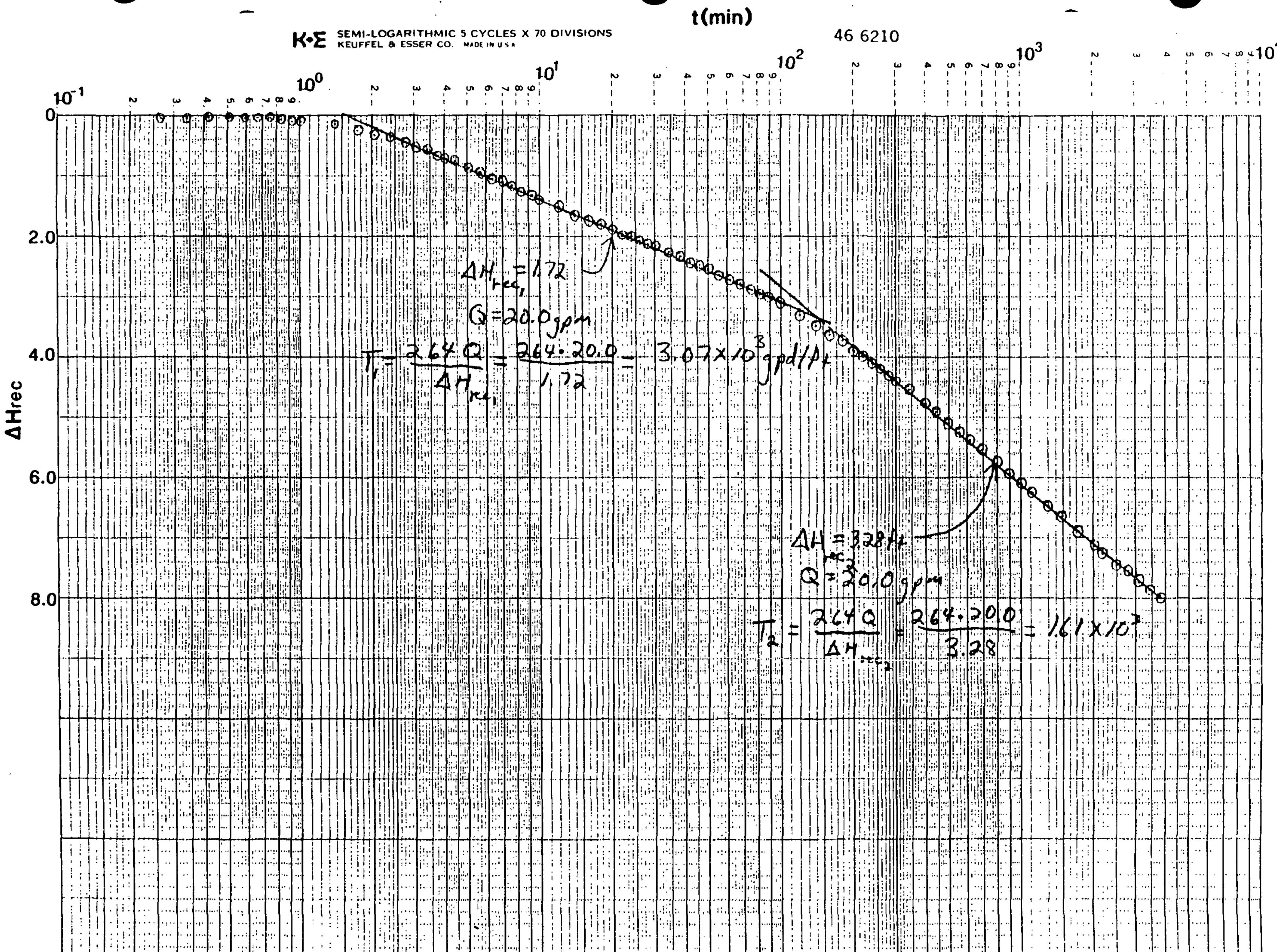
LOG-LOG PLOT OF GW-25 9/15/86



PLOT BY C. AREND



REI 10-1 RUN #1 PUMP TEST - RECOVERY PLOT BY M. BARRON



REI 10-1 RUN #1 PUMP TEST - RECOVERY

PLOT BY D. GABRYSCH

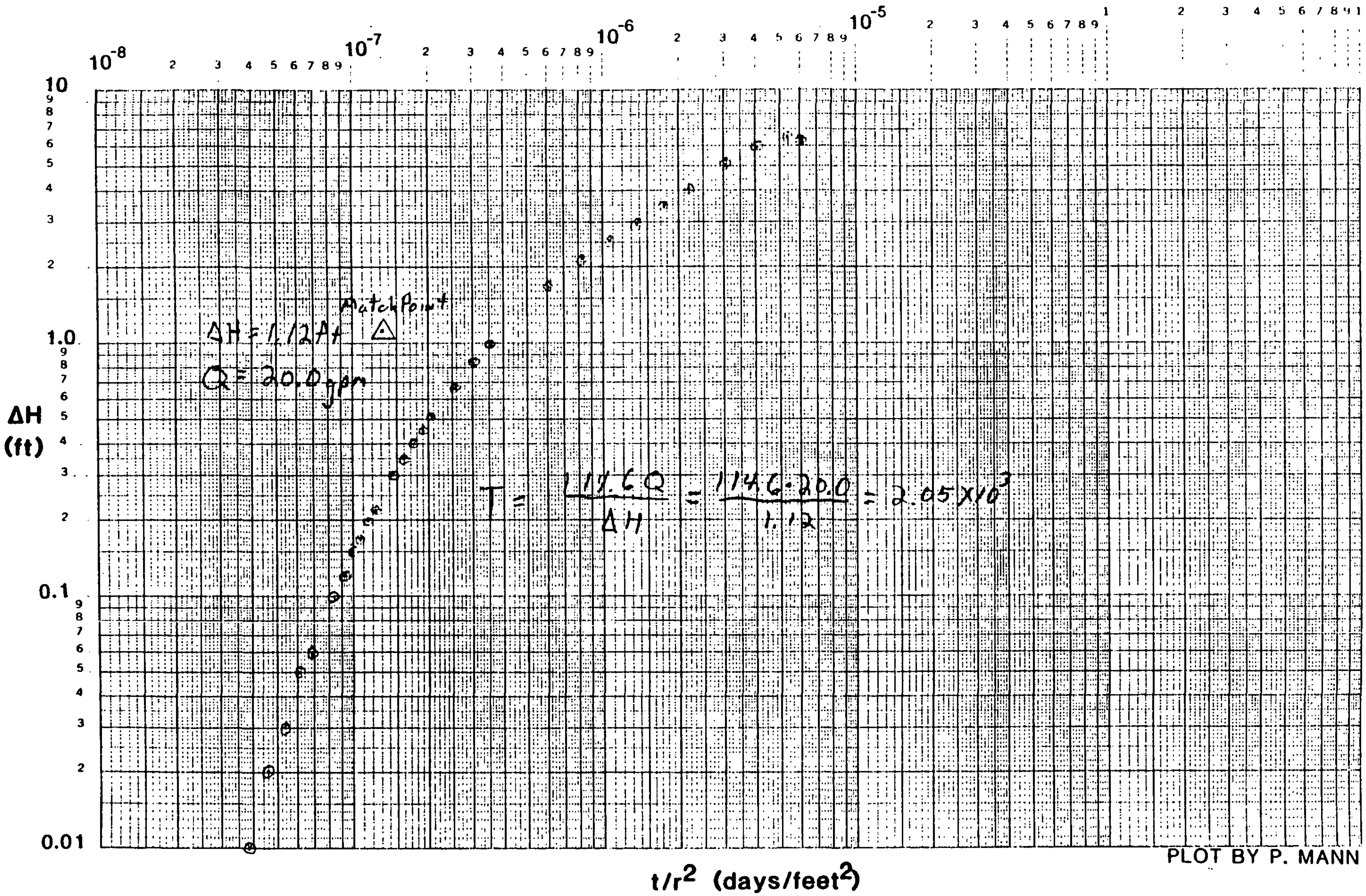
SEMI LOG PLOT OF GW-25 9/15/86

K·E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI-11 9/15/86



CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: Fernald [illegible] JOB NO.: 275-14

SUBJECT: RFI 10-1 Run #1 Calc. for RFI 11

COMPUTED BY: DES DATE: 11-15-8[illegible]

CHECKED BY: DD DATE: 11-15-8[illegible]

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 1.12$ ft

$$T = \frac{(114.6)(20.0)}{1.12} = \boxed{2.05 \times 10^3 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{2.94 \times 10^{-4} \ m^2/s}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 1.32 \times 10^{-7}$ days/ft²

$T = \boxed{2.05 \times 10^3 \text{ gpd/ft}}$

$$S = \frac{(1)(2.05 \times 10^3)(1.32 \times 10^{-7})}{1.87} = \boxed{1.44 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

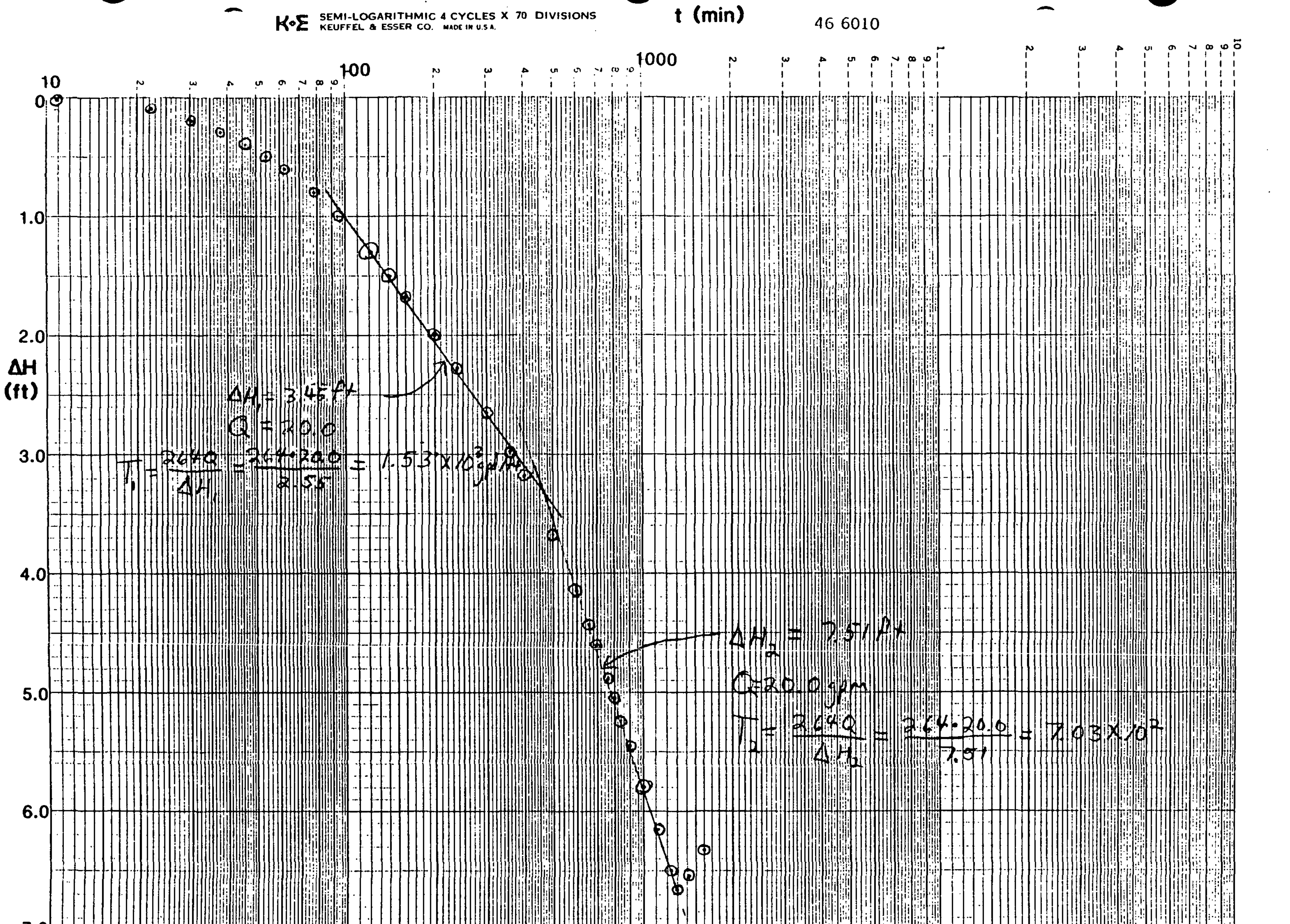
$T = \boxed{2.05 \times 10^3 \text{ gpd/ft}}$

$b = 16.45$ ft

$$K = \frac{2.05 \times 10^3}{16.45} = \boxed{1.24 \times 10^2 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.716 \times 10^{-5} = \boxed{5.87 \times 10^{-3} \text{ cm/s}}$$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI-11 9/15/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French LTD

JOB NO.: 276-16

SUBJECT: REI 10-1 Run #1 Calc for REI 11

COMPUTED BY: DRS DATE: ___

CHECKED BY: DD DATE: 11-19-84

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H_1 = 3.45$ ft $\quad T_1 = \frac{(264)(20.0)}{3.45} = \boxed{1.53 \times 10^3 \text{ gpd/ft}}$

$\Delta H_2 = 7.51$ ft $\quad T_2 = \frac{(264)(20.0)}{7.51} = \boxed{7.03 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} = $\boxed{2.20 \times 10^{-4} \text{ m}^2\text{/s}}$ $\boxed{1.01 \times 10^{-4} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_o}{r^2}$$

$r = 427.782$ ft

$t_{o_1} = 51 \text{ min}/1440 = 3.54 \times 10^{-2}$ days

$T_1 = \boxed{1.53 \times 10^3 \text{ gpd/ft}}$

$t_{o_2} = 167 \text{ min}/1440 = 1.16 \times 10^{-1}$ days

$T_2 = \boxed{7.03 \times 10^2 \text{ gpd/ft}}$

$$S_1 = \frac{(0.3)(1.53 \times 10^3)(3.54 \times 10^{-2})}{(427.782)^2} = \boxed{8.65 \times 10^{-5}}$$

$$S_2 = \frac{(0.3)(7.03 \times 10^2)(1.16 \times 10^{-1})}{(427.782)^2} = \boxed{1.34 \times 10^{-4}}$$

ERT

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: Fre[illegible] [illegible] JOB NO.: 275-14

SUBJECT: REI 10-1 Run #1 Calc for REI 11 COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: DD DATE: 11-[illegible]-86

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T_1 = \boxed{1.53 \times 10^3 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{1.53 \times 10^3}{16.45} = \boxed{9.30 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor 4.715×10^{-5} = $\boxed{4.39 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{7.03 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{7.03 \times 10^2}{16.45} = \boxed{4.27 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor 4.715×10^{-5} = $\boxed{2.02 \times 10^{-3} \text{ cm/s}}$

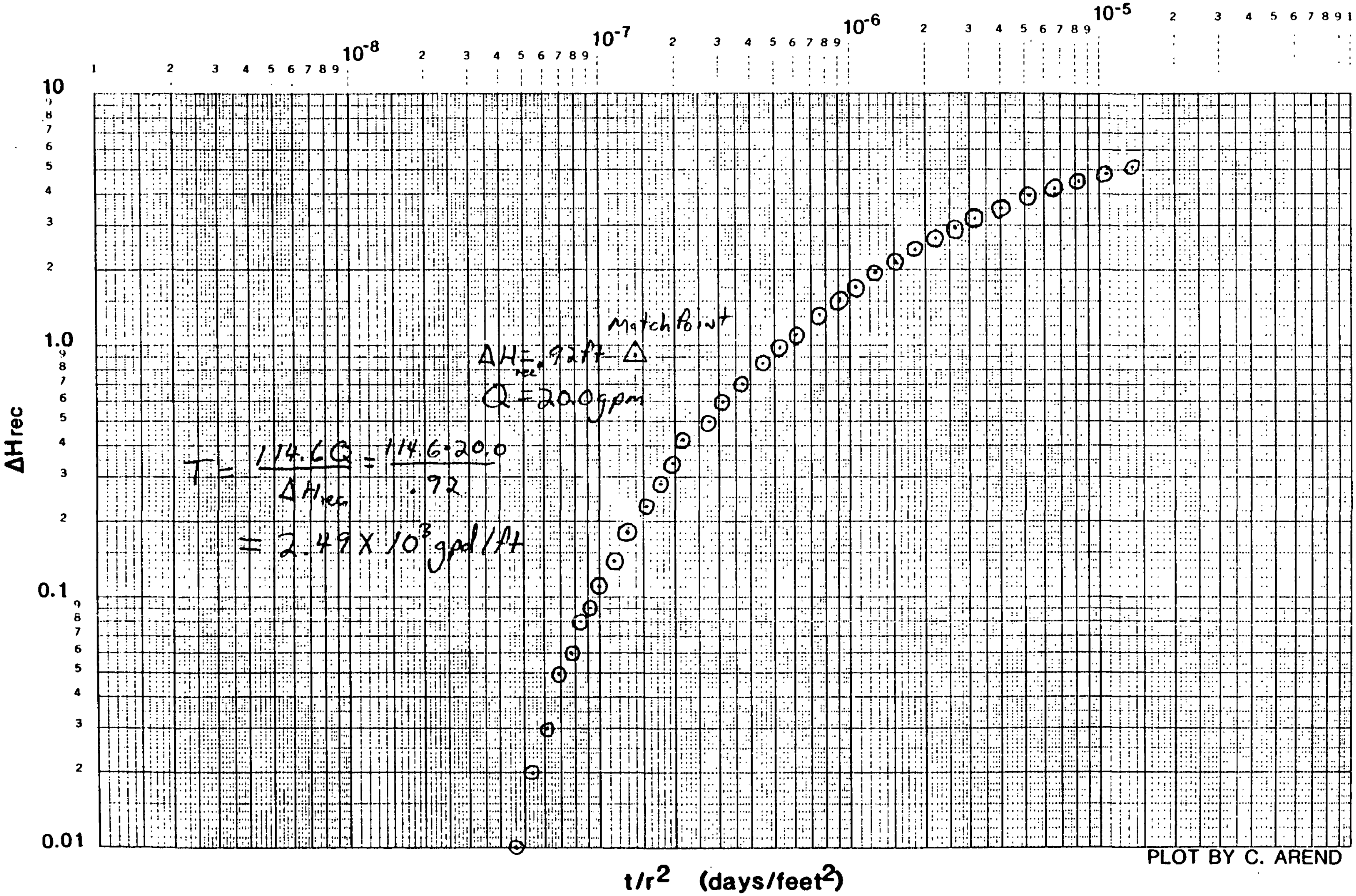
ERT

K+E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

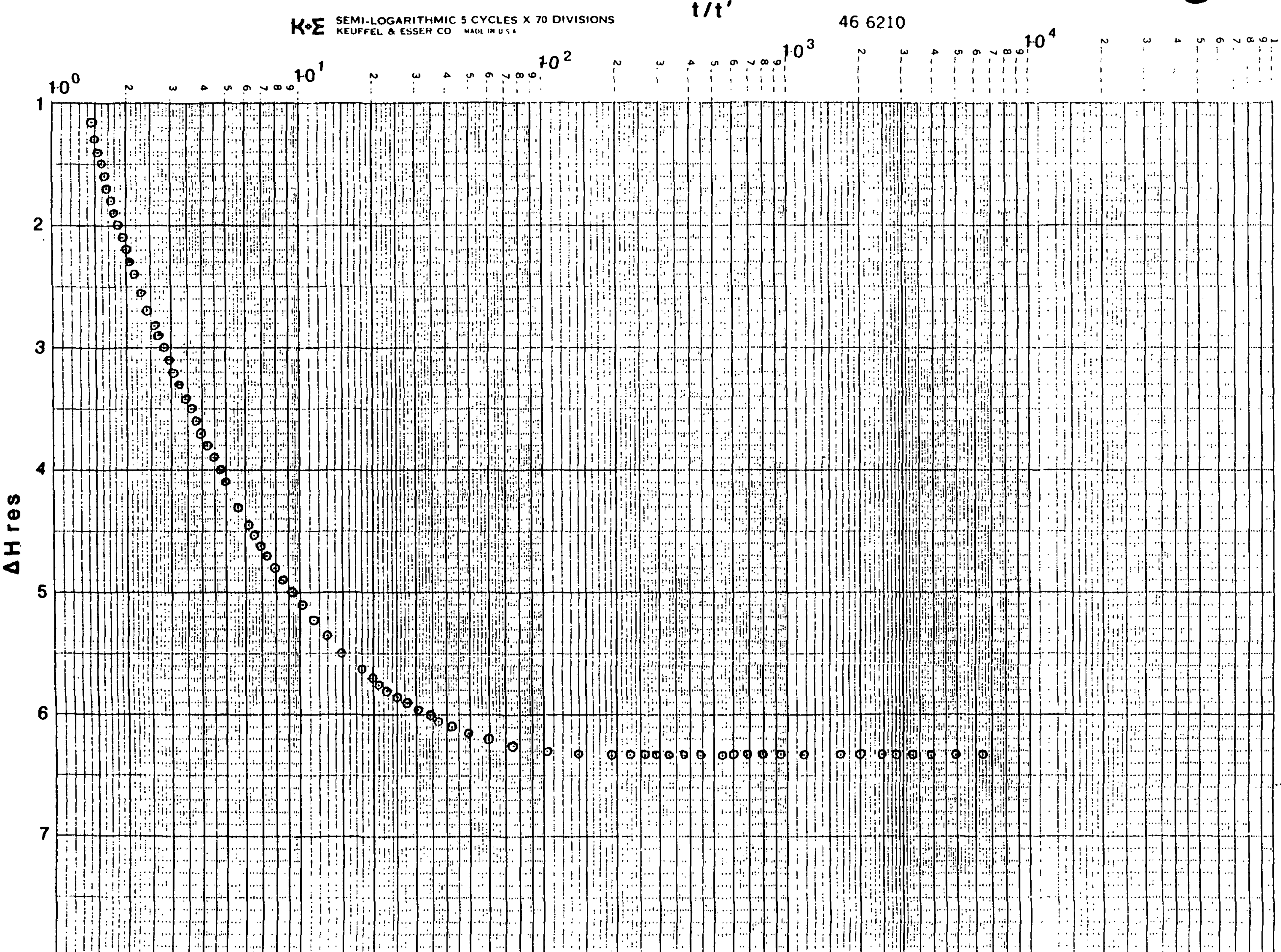
46 7520

REI 10-1 RUN #1 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI-11 9/15/86

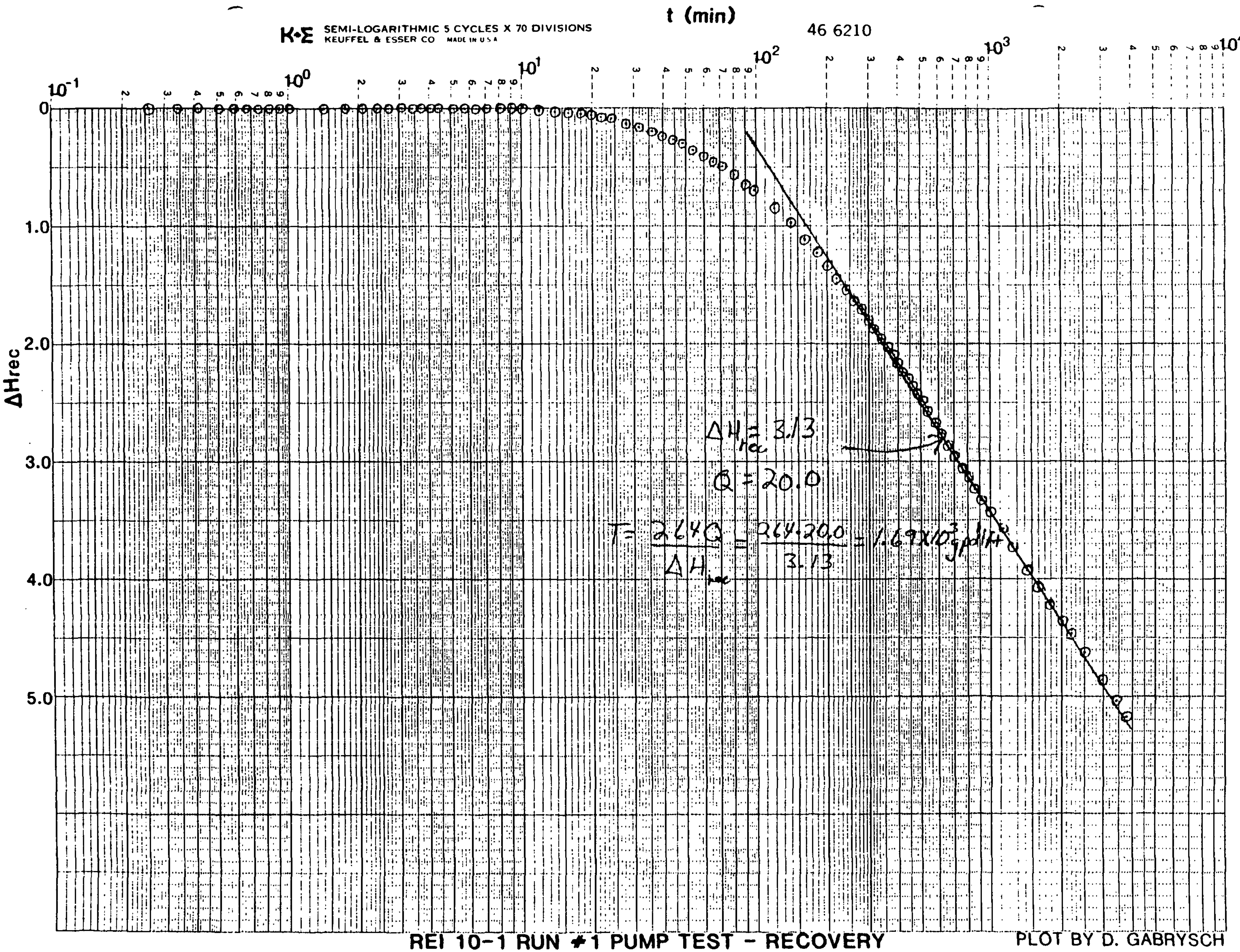


PLOT BY C. AREND



REI 10-1 RUN #1 PUMP TEST - RECOVERY

PLOT BY M. BARRON



REI 10-1 RUN #1 PUMP TEST - RECOVERY

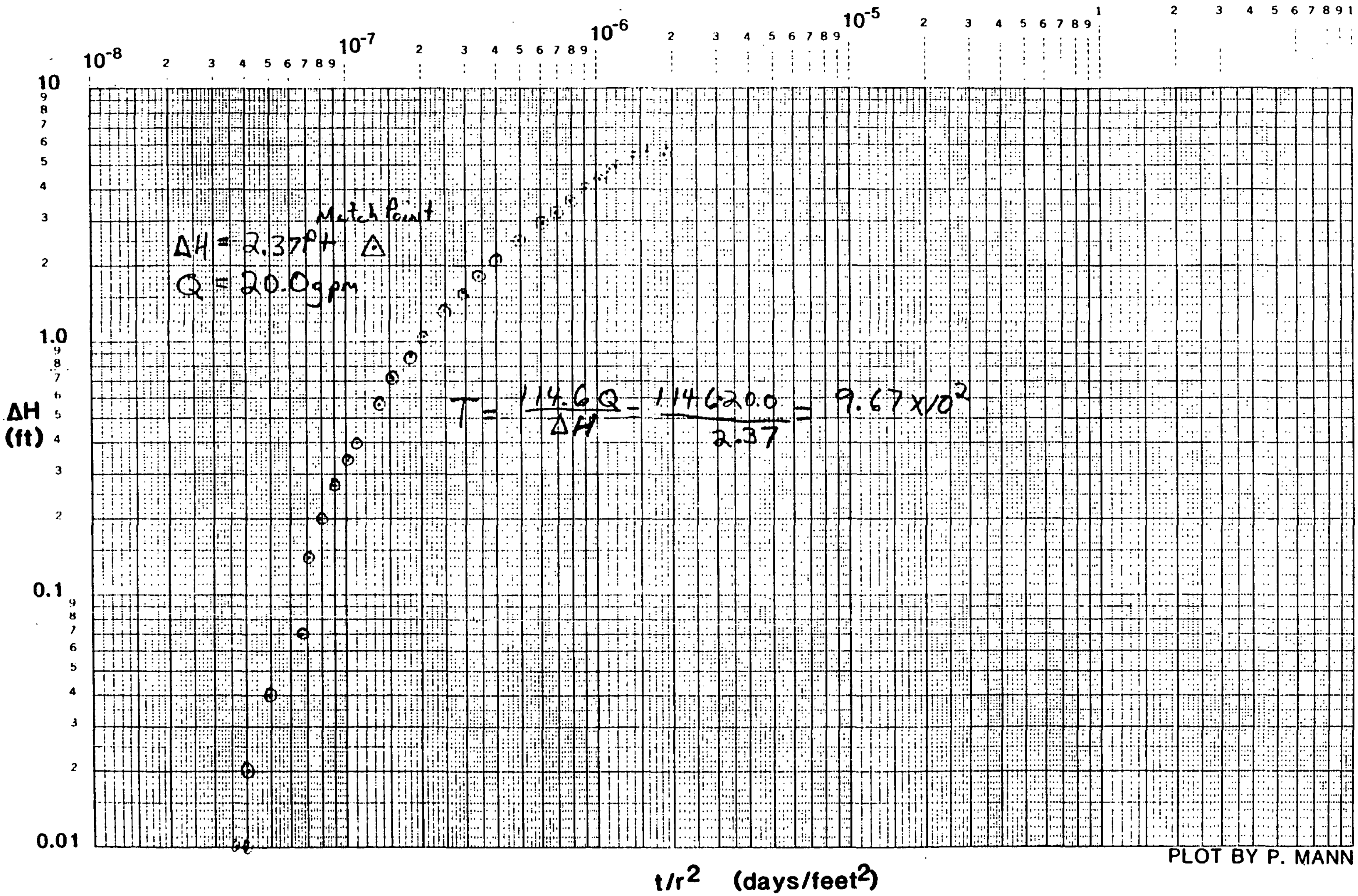
PLOT BY D. GABRYSCH

K+E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-4 9/15/86



PLOT BY P. MANN

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #1 Calc for REI 3-4

COMPUTED BY: DCG DATE: 11-12-8

CHECKED BY: DD DATE: 11-19-85

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 2.37$ ft

$$T = \frac{(114.6)(20.0)}{2.37} = \boxed{9.67 \times 10^2 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.432 \times 10^{-7} = \boxed{1.39 \times 10^{-4} \text{ m}^2/\text{s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 1.30 \times 10^{-7}$ days/ft^2

$T = \boxed{9.67 \times 10^2 \text{ gpd/ft}}$

$$S = \frac{(1)(9.67 \times 10^2)(1.30 \times 10^{-7})}{1.87} = \boxed{6.72 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

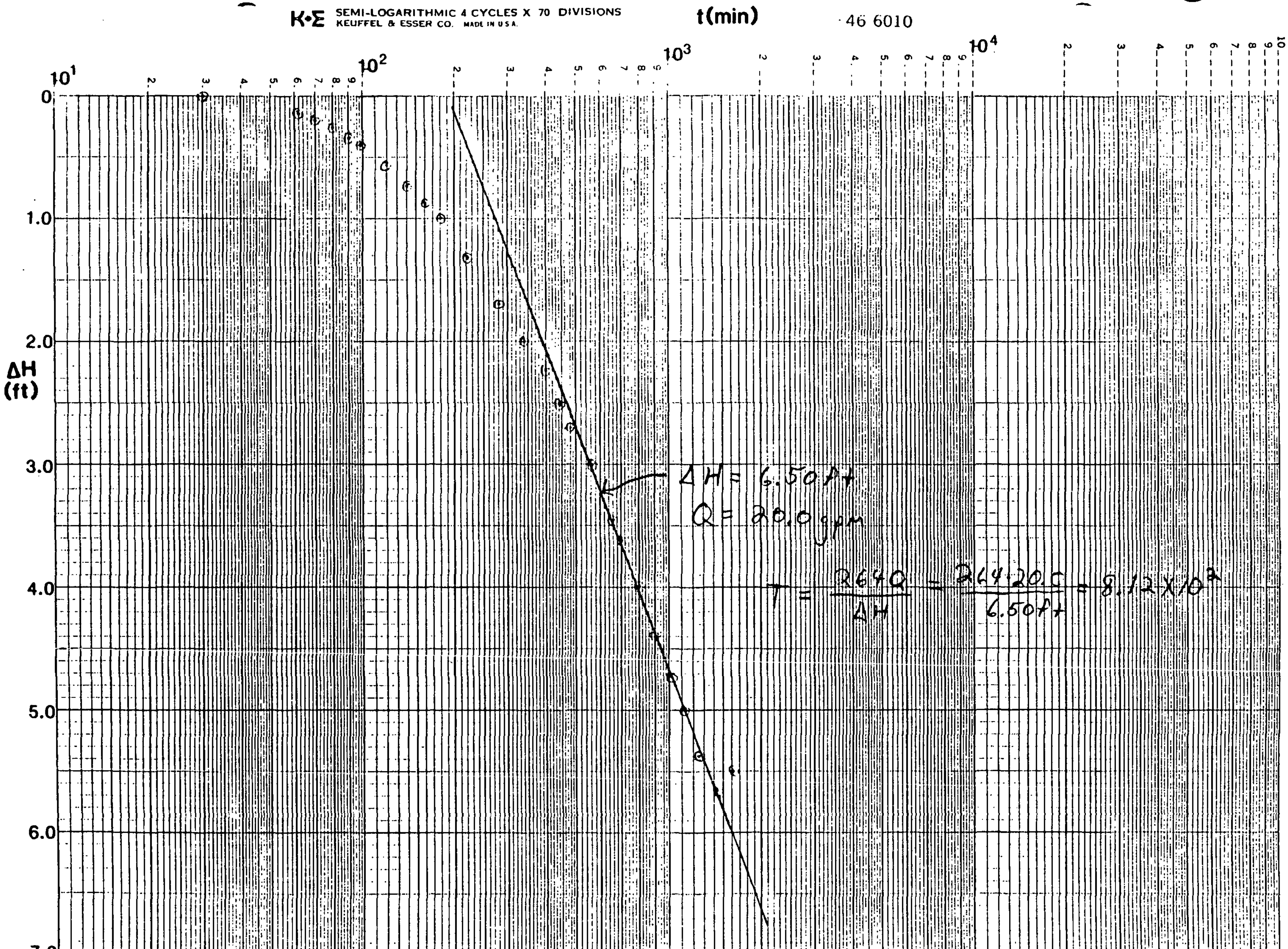
$T = \boxed{9.67 \times 10^2 \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{9.67 \times 10^2}{23.0} = \boxed{4.20 \times 10^1 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.98 \times 10^{-3} \text{ cm/s}}$$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 3-4 9/15/86

PLOT BY P. MANN

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #1 Calc for REI 3-4

COMPUTED BY: DRS DATE: 11-1-8?

CHECKED BY: DD DATE: 11-16-8?

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H = 6.50$ ft

$$T = \frac{(264)(20.0)}{6.50} = \boxed{8.12 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.17 \times 10^{-4} \text{ m}^2/\text{s}}$$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T\,t_o}{r^2}$$

$r = 784.360$ ft

$t_o = 192 \text{ min} / 1440 = 1.33 \times 10^{-1}$ days

$T = \boxed{8.12 \times 10^{2} \text{ gpd/ft}}$

$$S = \frac{(0.3)(8.12 \times 10^{2})(1.33 \times 10^{-1})}{(784.360)^2} = \boxed{5.27 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{8.12 \times 10^{2} \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{8.12 \times 10^{2}}{23.0} = \boxed{3.53 \times 10^{1} \text{ gpd/ft}^2}$$

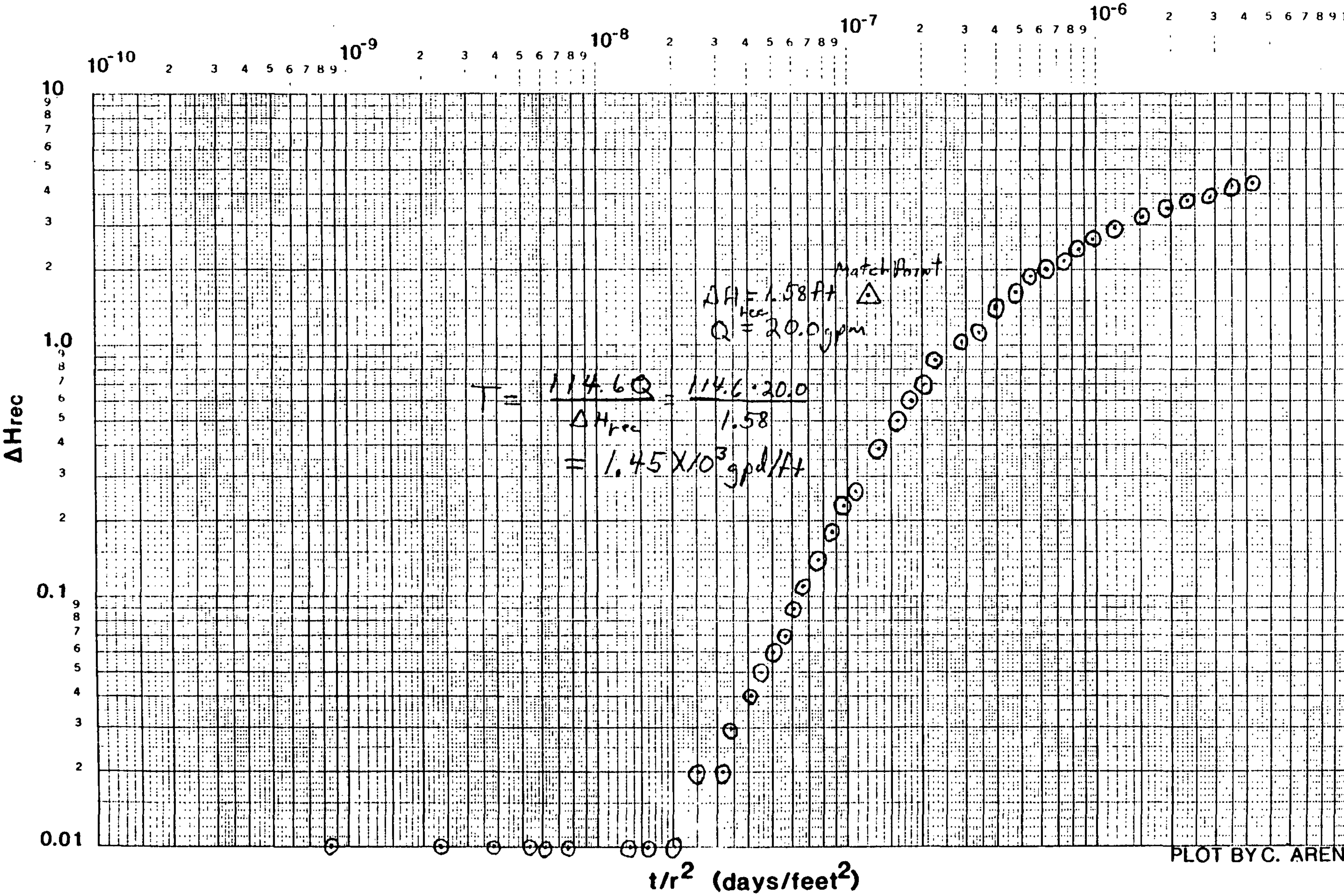
$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.67 \times 10^{-3} \text{ cm/s}}$$

ERT

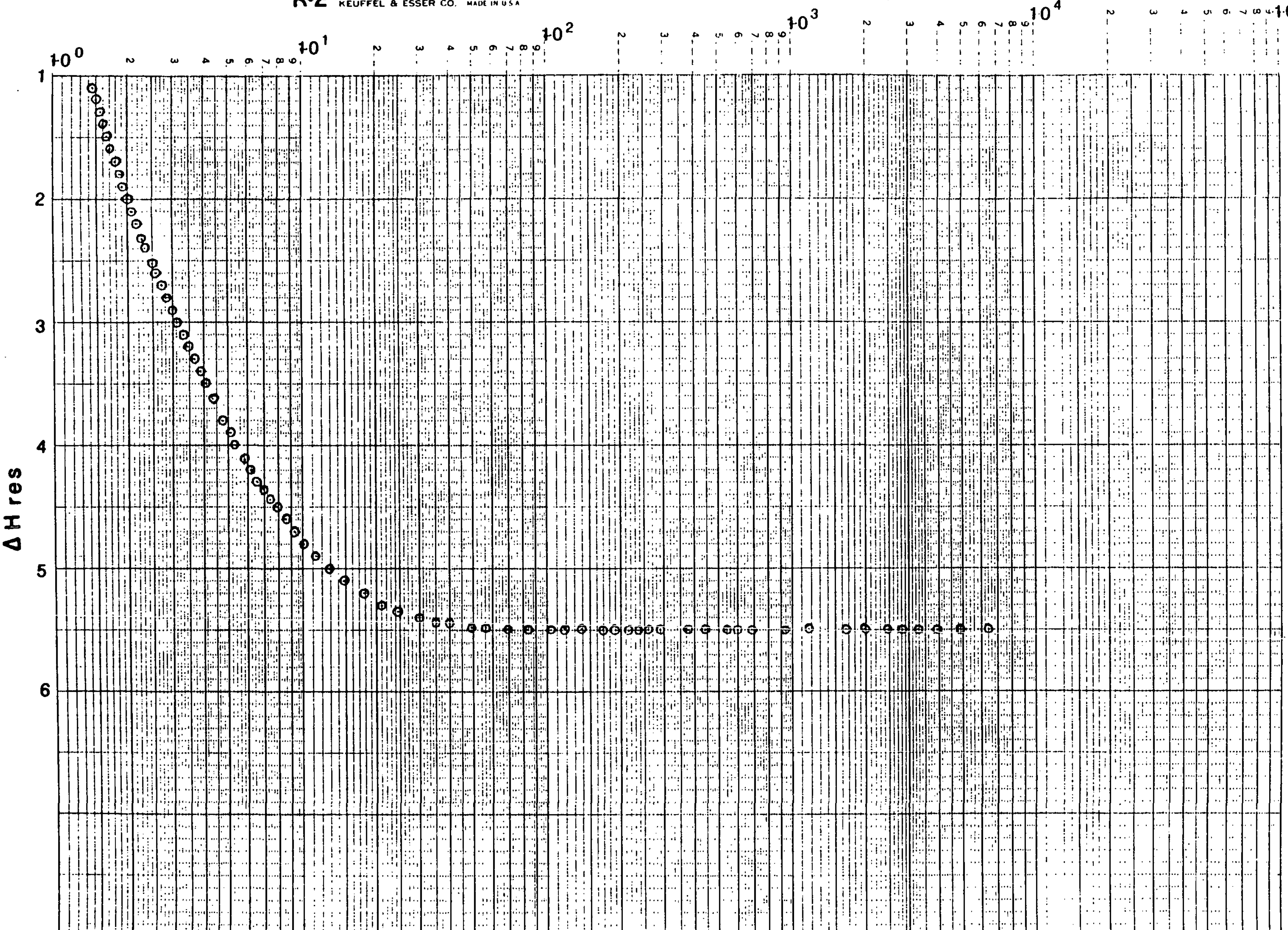
K•E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7520

REI 10-1 RUN #1 PUMP TEST - RECOVERY

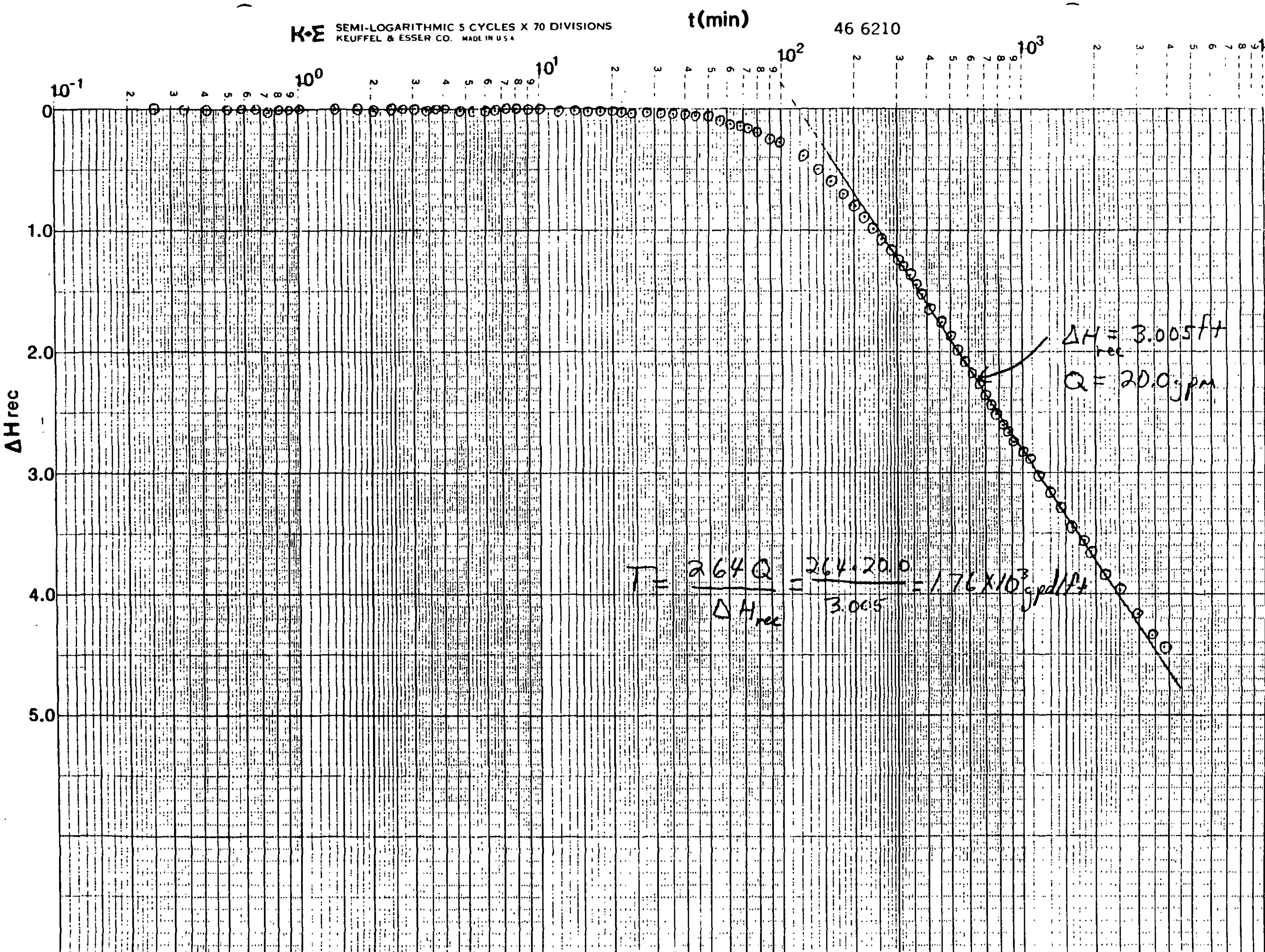
LOG-LOG PLOT OF REI 3-4 9/15/86



PLOT BY C. AREND

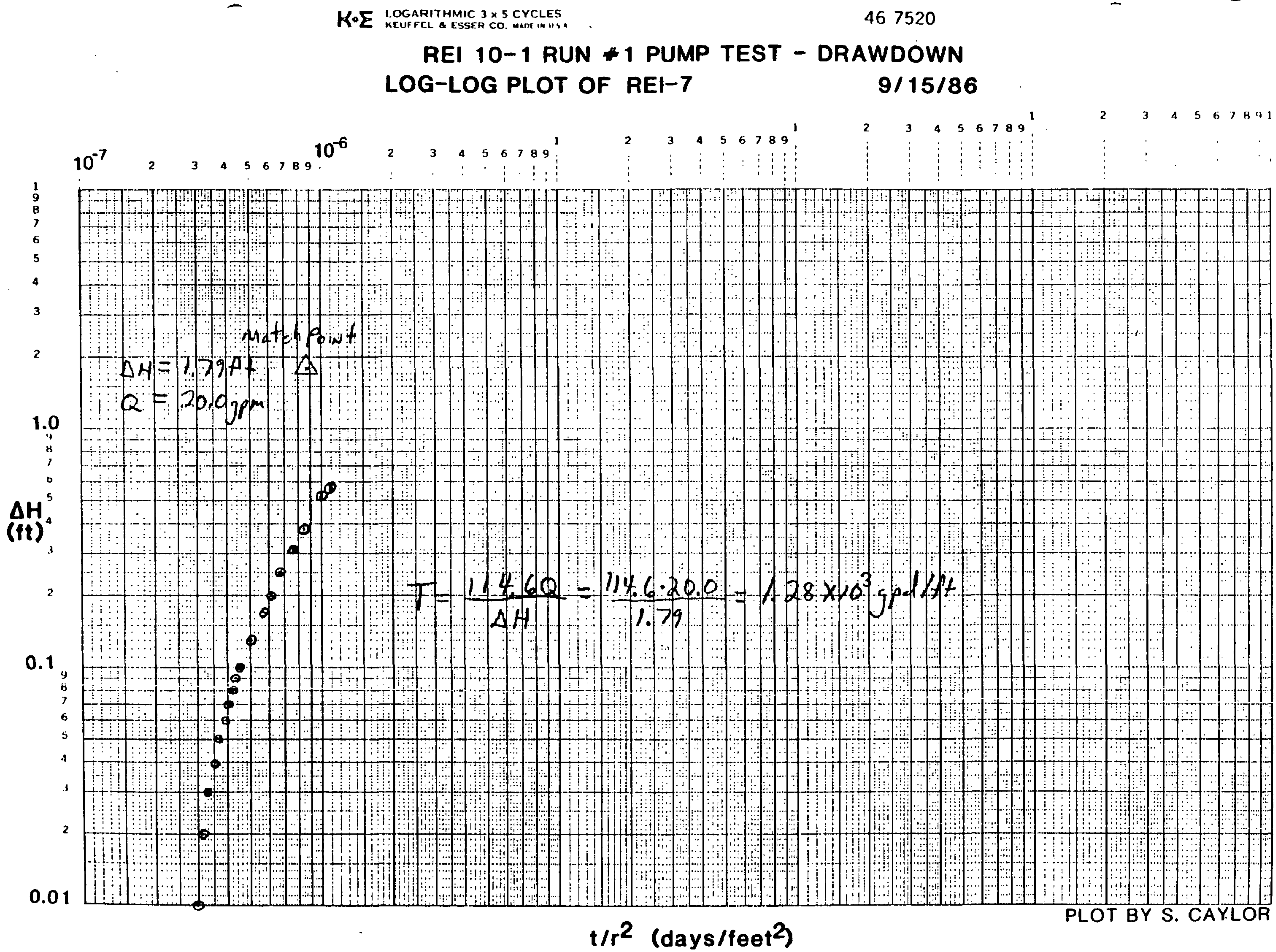


REI 10-1 RUN #1 PUMP TEST - RECOVERY
PLOT BY M. BARRON
SEMI-LOG PLOT OF REI 3-4
9/15/86



REI 10-1 RUN #1 PUMP TEST - RECOVERY

PLOT BY D. GABRYSCH



K·E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 7520
REI 10-1 RUN #1 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI-7
9/15/86
Match Point
ΔH = 1.79 ft
Q = 20.0 gpm
T = 114.6Q / ΔH = 114.6·20.0 / 1.79 = 1.28 x 10^3 gpd/ft
ΔH (ft)
t/r^2 (days/feet^2)
PLOT BY S. CAYLOR

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd.

JOB NO.: 273-15

SUBJECT: REI 10-1 Run #1 Calc for REI 7

COMPUTED BY: DRG DATE: 11-15-86

CHECKED BY: DD DATE: 11-15-86

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 1.79$ ft $\qquad T = \frac{(114.6)(20.0)}{1.79} = \boxed{1.28 \times 10^3 \text{ gpd/ft}}$

$\times$ Conversion Factor $1.438 \times 10^{-7} = \boxed{1.84 \times 10^{-4} \text{ m}^2/\text{s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 8.70 \times 10^{-7}$ days/ft²

$T = \boxed{1.28 \times 10^3 \text{ gpd/ft}}$

$S = \frac{(1)(1.28 \times 10^3)(8.70 \times 10^{-7})}{1.87} = \boxed{5.96 \times 10^{-4}}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

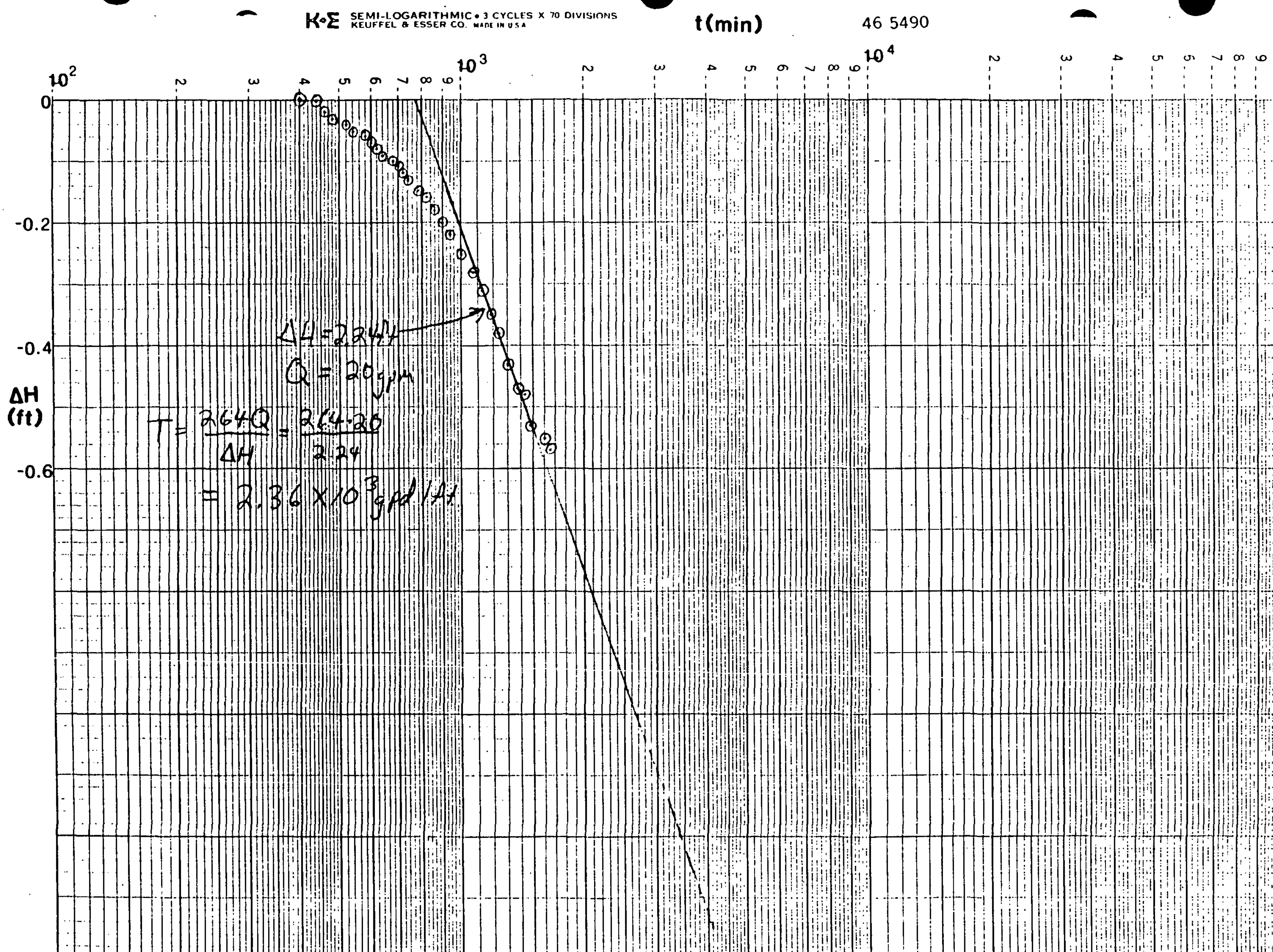
$T = \boxed{1.28 \times 10^3 \text{ gpd/ft}}$

$b = 15.0$ ft

$K = \frac{1.28 \times 10^3}{15.0} = \boxed{8.54 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{4.02 \times 10^{-3} \text{ cm/s}}$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

PLOT BY D. GABRYSCH

SEMI-LOG PLOT OF REI 7

9/15/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD — JOB NO.: 2?<-141

SUBJECT: REI 10-1 Run #1 Calc for REI 7 — COMPUTED BY: ___ DATE: ___ — CHECKED BY: DD DATE: 11-19-80

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H = 2.24$ ft $\quad T = \dfrac{(264)(20.0)}{2.24} = \boxed{2.36 \times 10^{3} \text{ gpd/ft}}$

x Conversion Factor 1.438×10^{-7} = $\boxed{3.39 \times 10^{-4} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_0}{r^2}$$

$r = 1012.704$ ft

$t_0 = 775 \text{ min}/1440 = 5.38 \times 10^{-1}$ days

$T = \boxed{2.36 \times 10^{3} \text{ gpd/ft}}$

$$S = \frac{(0.3)(2.36 \times 10^{3})(5.38 \times 10^{-1})}{(1012.704)^2} = \boxed{3.71 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \dfrac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{2.36 \times 10^{3} \text{ gpd/ft}}$

$b = 15.0$ ft

$$K = \frac{2.36 \times 10^{3}}{15.0} = \boxed{1.57 \times 10^{2} \text{ gpd/ft}^2}$$

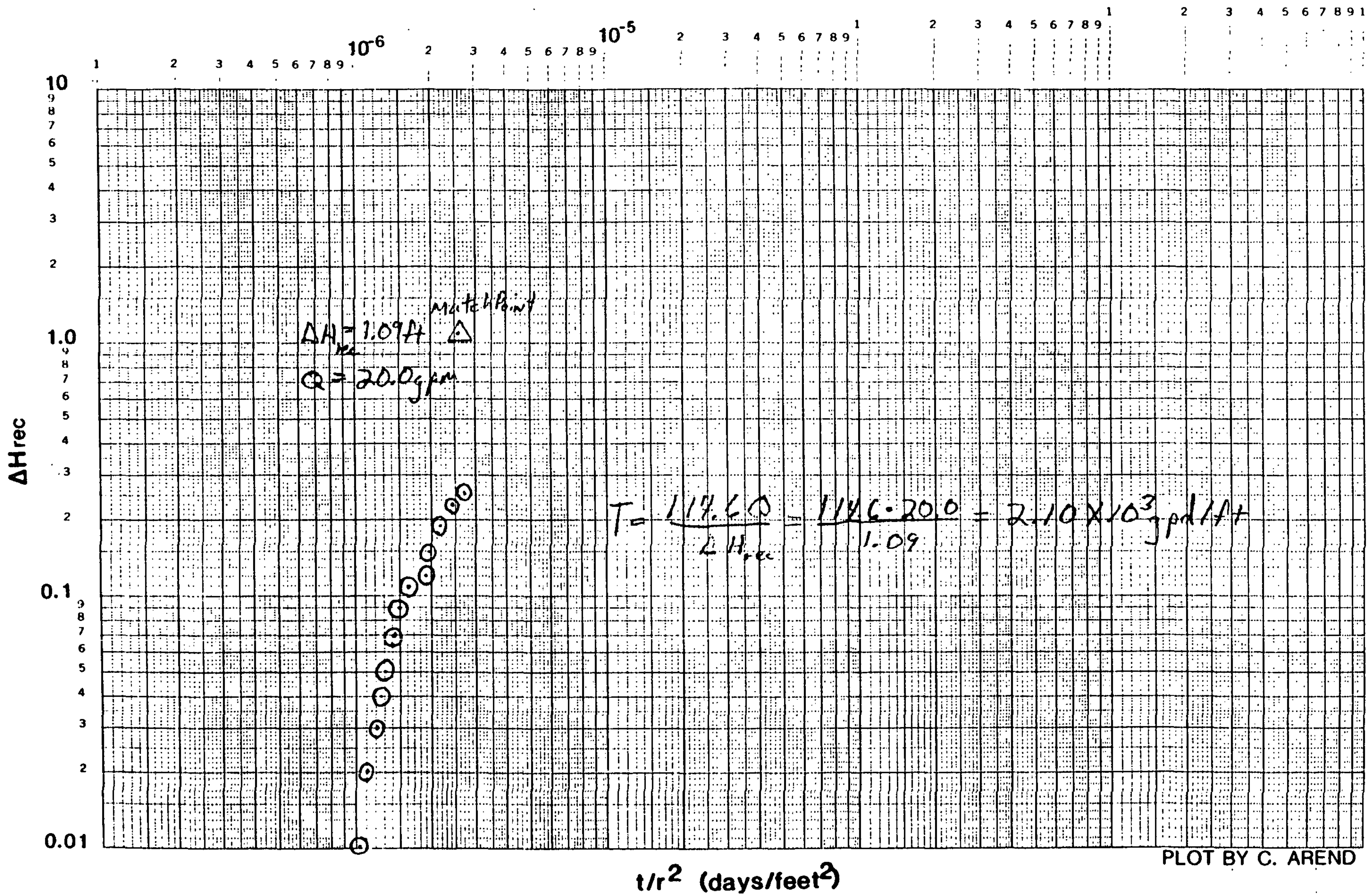
X Conversion Factor 4.715×10^{-5} = $\boxed{7.41 \times 10^{-3} \text{ cm/s}}$

ERT

K+E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7520

REI 10-1 RUN #1 PUMP TEST - RECOVERY

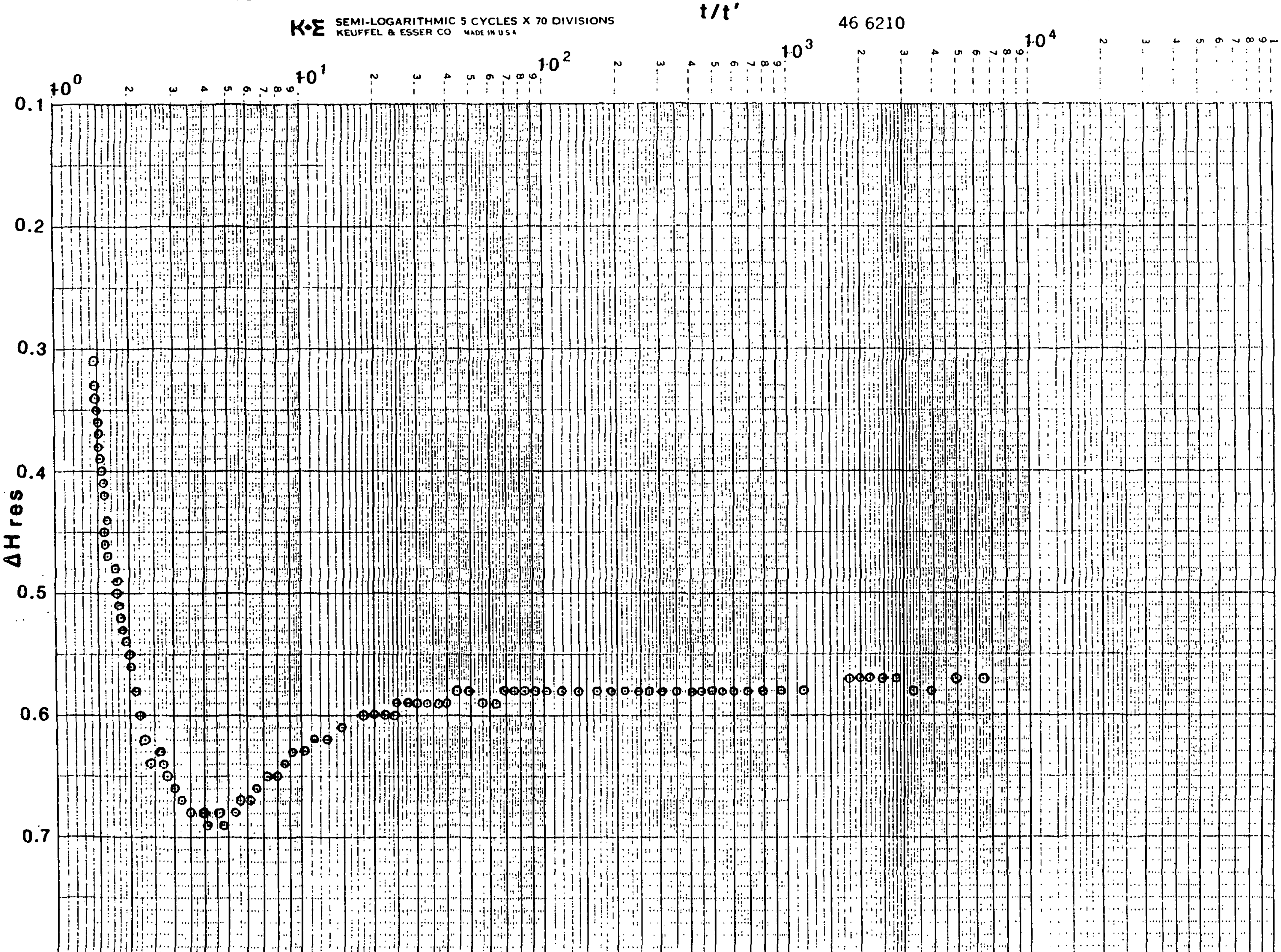
LOG-LOG PLOT OF REI-7 9/15/86



PLOT BY C. AREND

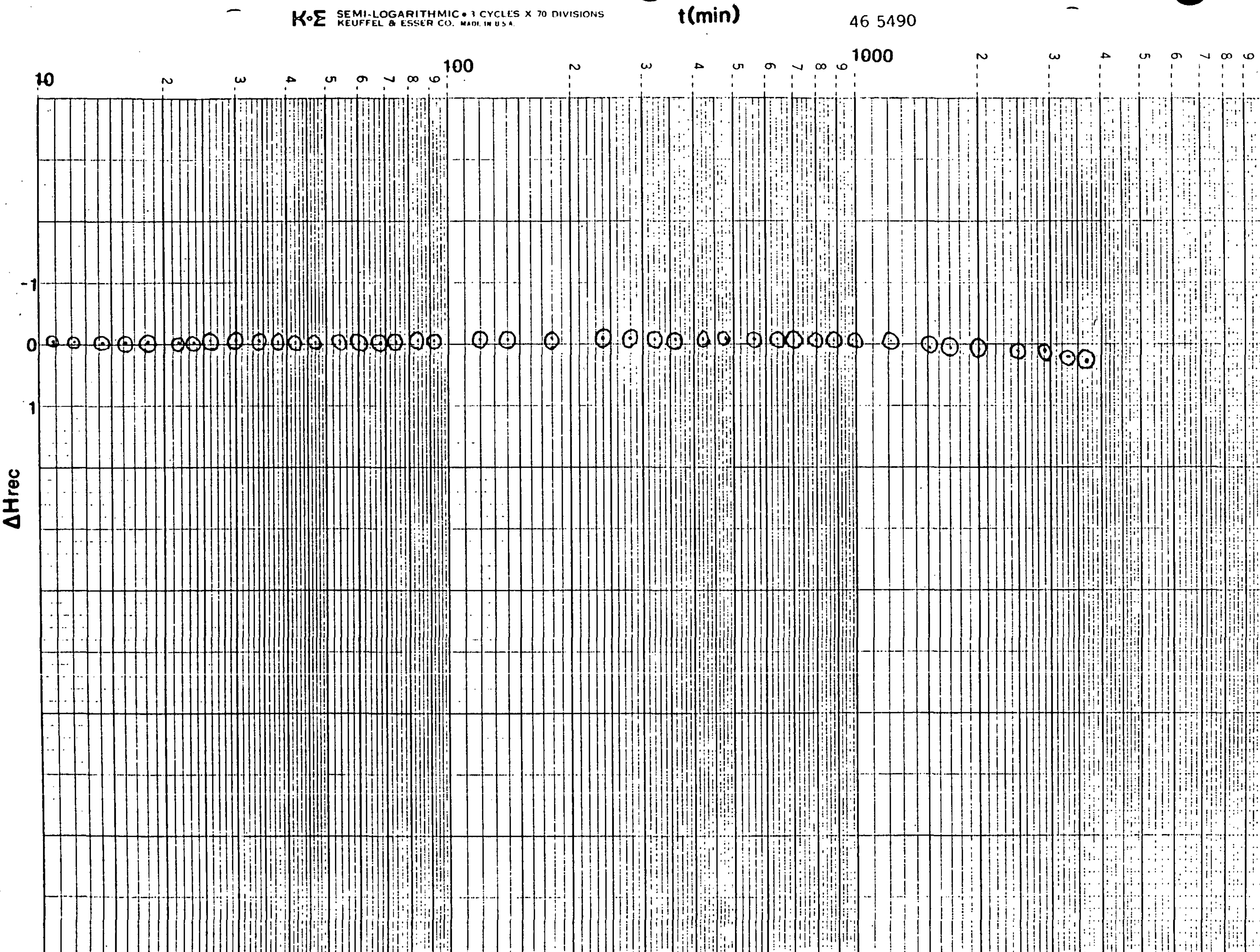
K•E SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO MADE IN U.S.A

46 6210



REI 10-1 RUN #1 PUMP TEST - RECOVERY

PLOT BY M. BARRON



REI 10-1 RUN #1 PUMP TEST - RECOVERY

PLOT BY C. AREND

SEMI-LOG PLOT OF REI-7

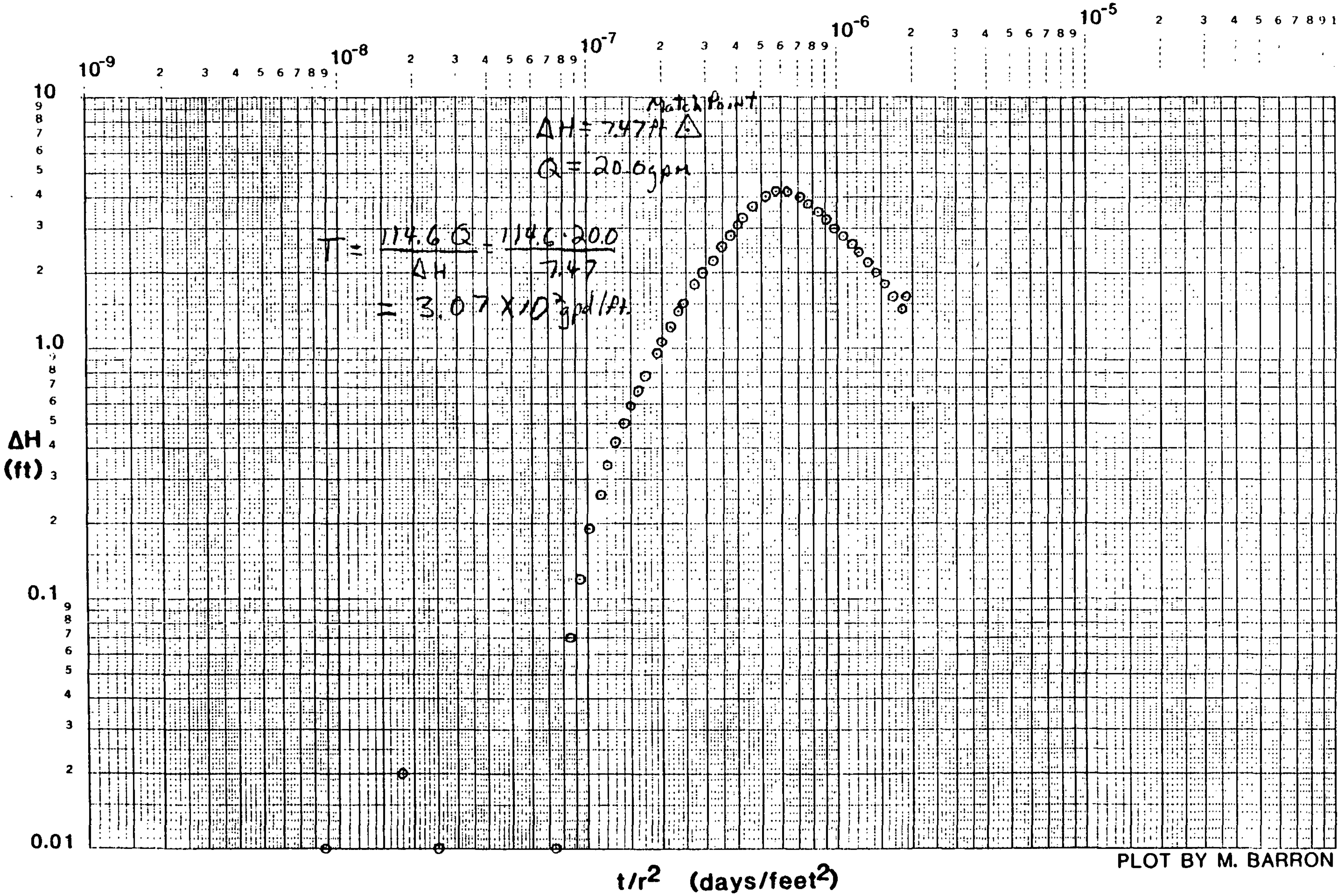
9/15/86

K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520.

REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 12-1 9/15/86



PLOT BY M. BARRON

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #1 Calc. for REI 10-1

COMPUTED BY: ___ DATE: ___

CHECKED BY: DD DATE: 11-19-86

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 20.0$ gpm

$\Delta H = 7.47$ ft $\quad T = \frac{(114.6)(20.0)}{7.47} = \boxed{3.07 \times 10^2 \text{ gpd/ft}}$

$\times$ Conversion Factor $1.438 \times 10^{-7} = \boxed{4.41 \times 10^{-5} \text{ m}^2/\text{s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 2.60 \times 10^{-7}$ days/ft^2

$T = \boxed{3.07 \times 10^2 \text{ gpd/ft}}$

$$S = \frac{(1)(3.07 \times 10^2)(2.60 \times 10^{-7})}{1.87} = \boxed{4.27 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

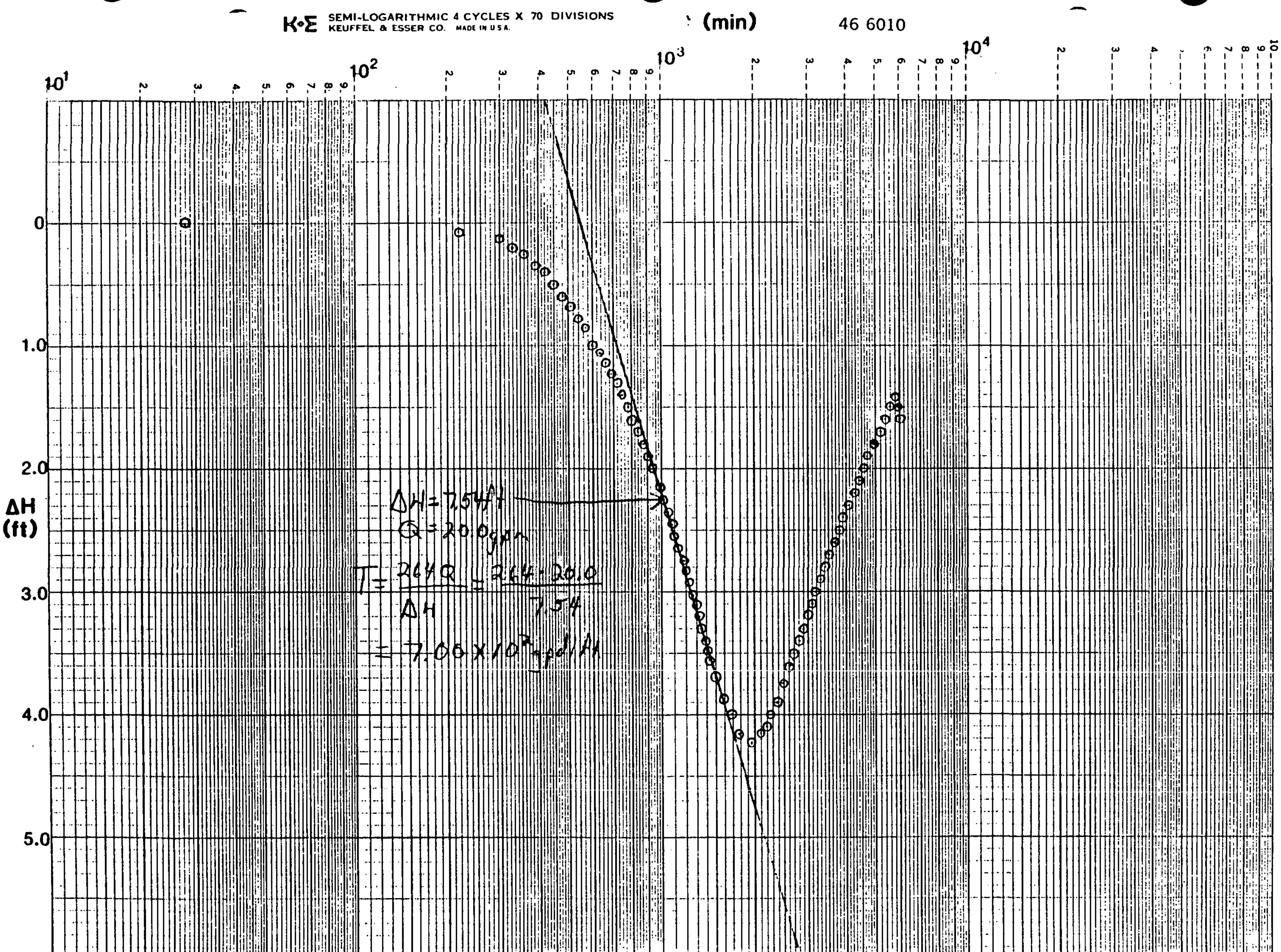
$T = \boxed{3.07 \times 10^2 \text{ gpd/ft}}$

$b = 36.75$ ft

$$K = \frac{3.07 \times 10^2}{36.75} = \boxed{8.35 \times 10^0 \text{ gpd/ft}^2}$$

$\times$ Conversion Factor 4.716×10^{-5} $\boxed{3.94 \times 10^{-4} \text{ cm/s}}$

ERT



REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 12-1 9/15/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd

JOB NO.: [illegible]

SUBJECT: PEI 10-1 Run #1 Calc for PEI 12-1

COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 20.0$ gpm

$\Delta H = 7.54$ ft

$$T = \frac{(264)(20.0)}{7.54} = \boxed{7.00 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.432 \times 10^{-7} = \boxed{1.01 \times 10^{-4} \text{ m}^2\text{/s}}$$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3 T t_0}{r^2}$$

$r = 1492.112$ ft

$t_0 = 550$ min $/1440 = 3.82 \times 10^{-1}$ days

$T = \boxed{7.00 \times 10^{2} \text{ gpd/ft}}$

$$S = \frac{(0.3)(7.00 \times 10^{2})(3.82 \times 10^{-1})}{(1492.112)^2} \quad \boxed{3.60 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{7.00 \times 10^{2} \text{ gpd/ft}}$

$b = 36.75$ ft

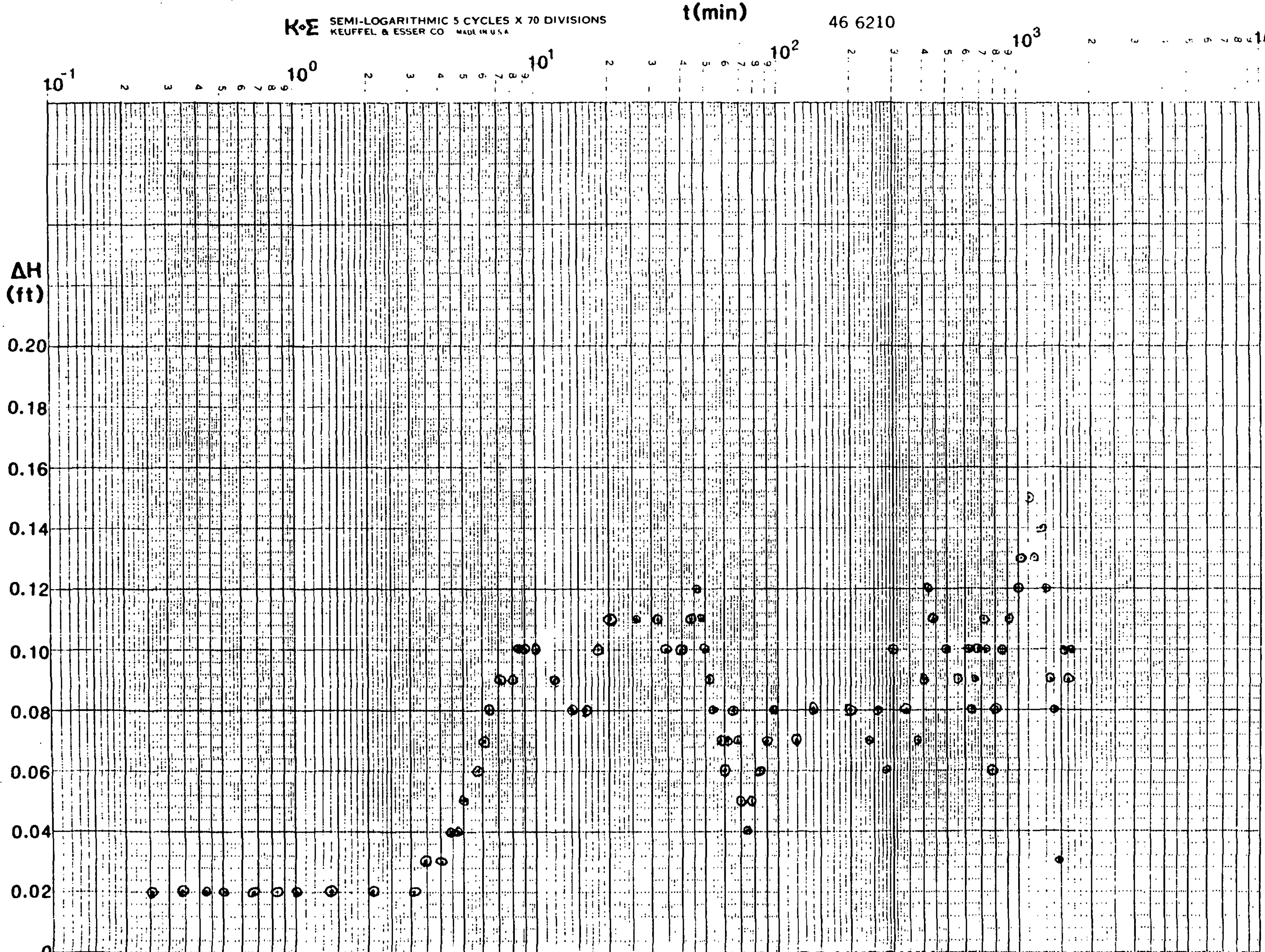
$$K = \frac{7.00 \times 10^{2}}{36.75} = \boxed{1.91 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{8.98 \times 10^{-4} \text{ cm/s}}$$

ERT

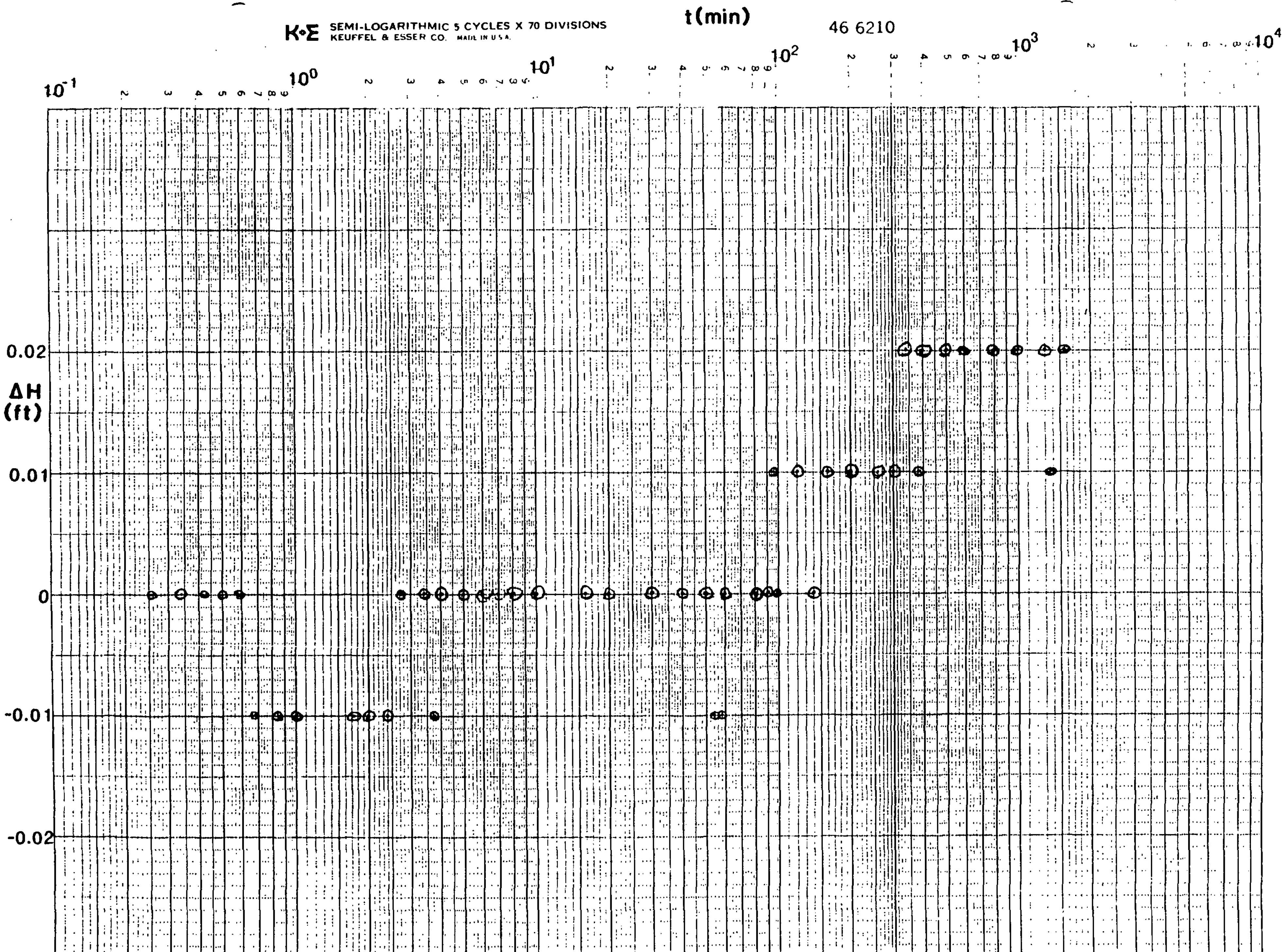
K•Σ SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 6210



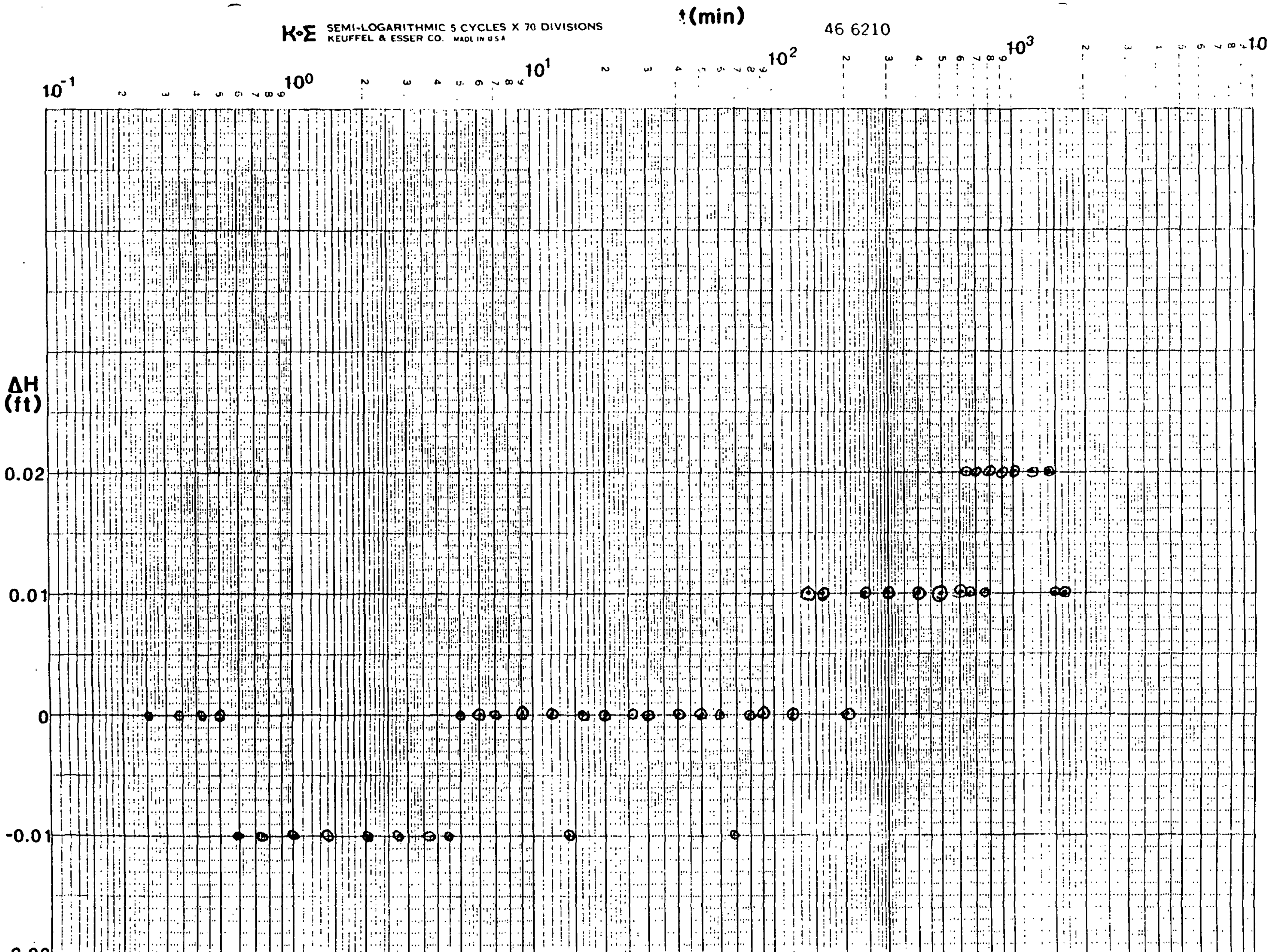
REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

PLOT BY T. BOCCA

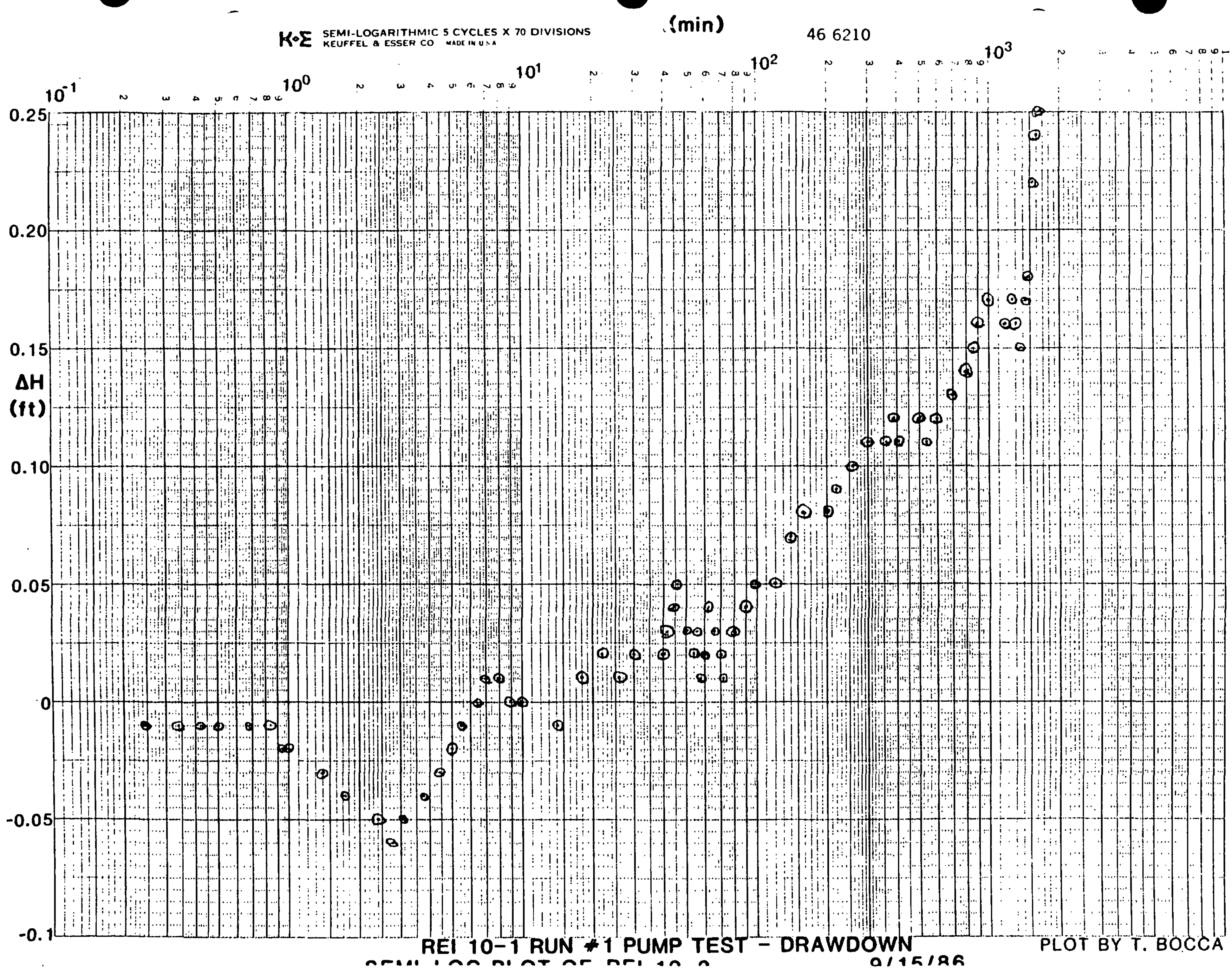


REI 10-1 RUN #1 PUMP TEST - DRAWDOWN

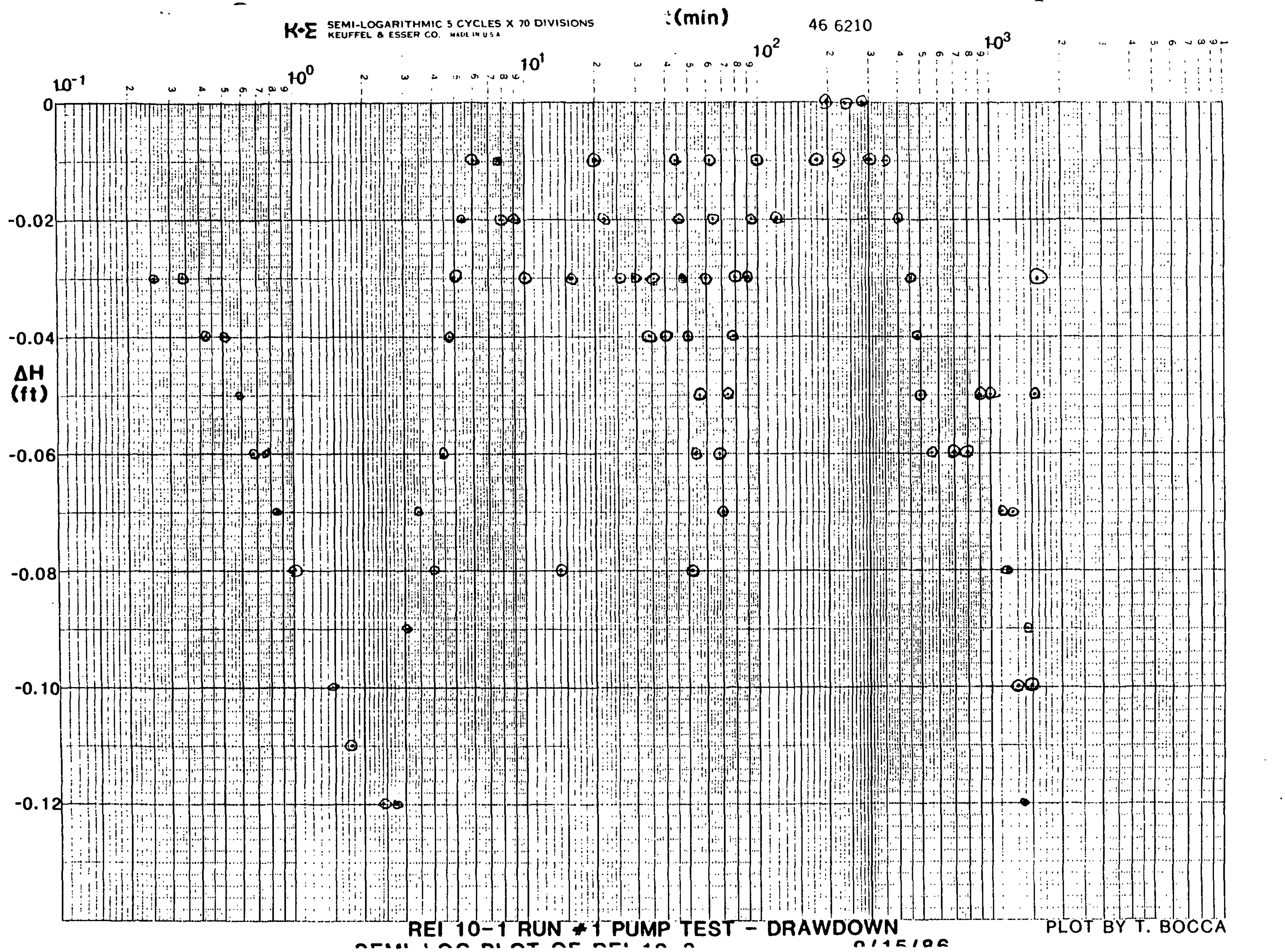
PLOT BY T. BOCCA

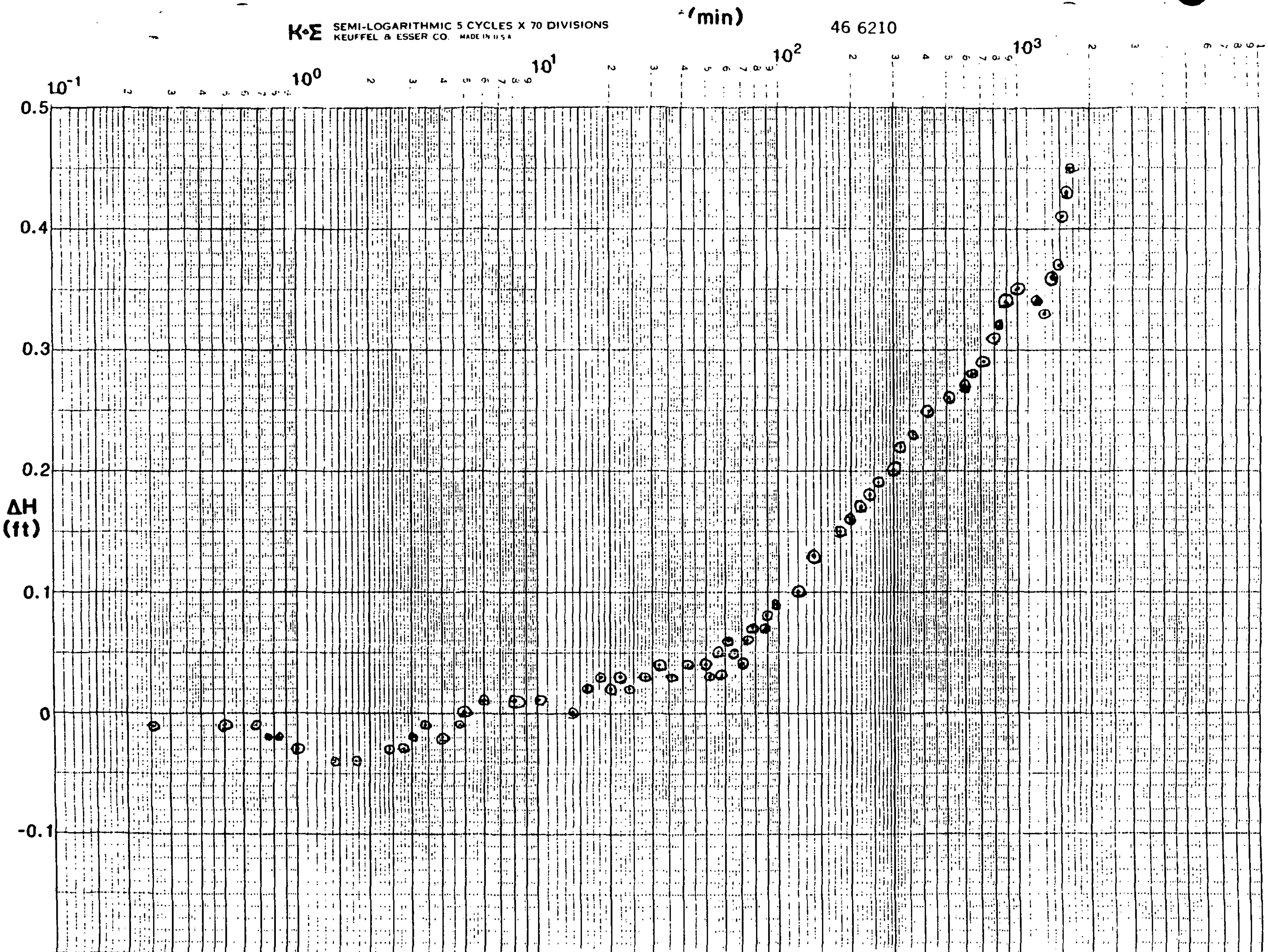


REI 10-1 RUN #1 PUMP TEST - DRAWDOWN PLOT BY T. BOCCA



K•Σ SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO MADE IN U.S.A.
46 6210
(min)
ΔH (ft)
REI 10-1 RUN #1 PUMP TEST - DRAWDOWN
PLOT BY T. BOCCA


K•Σ SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 6210
t(min)
ΔH (ft)
REI 10-1 RUN #1 PUMP TEST - DRAWDOWN
PLOT BY T. BOCCA

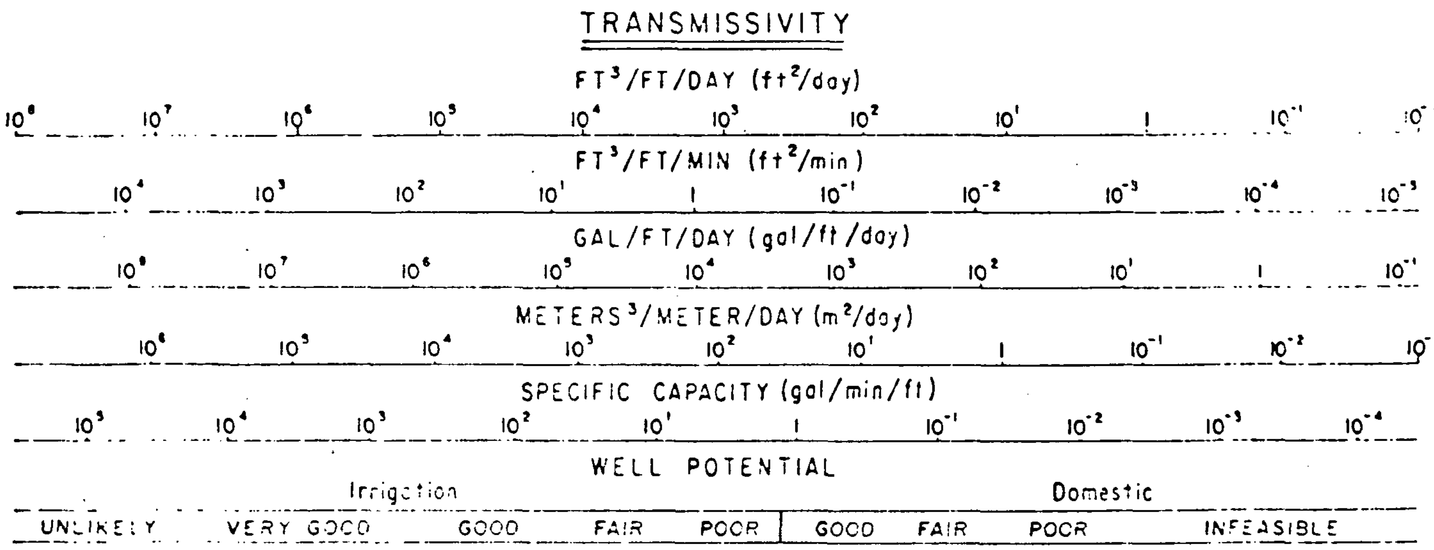


REI 10-1 RUN #1 PUMP TEST - DRAWDOWN PLOT BY T. BOCCA

SEMI-LOG PLOT OF REI 10-4 9/15/86

Attachment 7

Transmissivity - Well Potential Comparison Chart

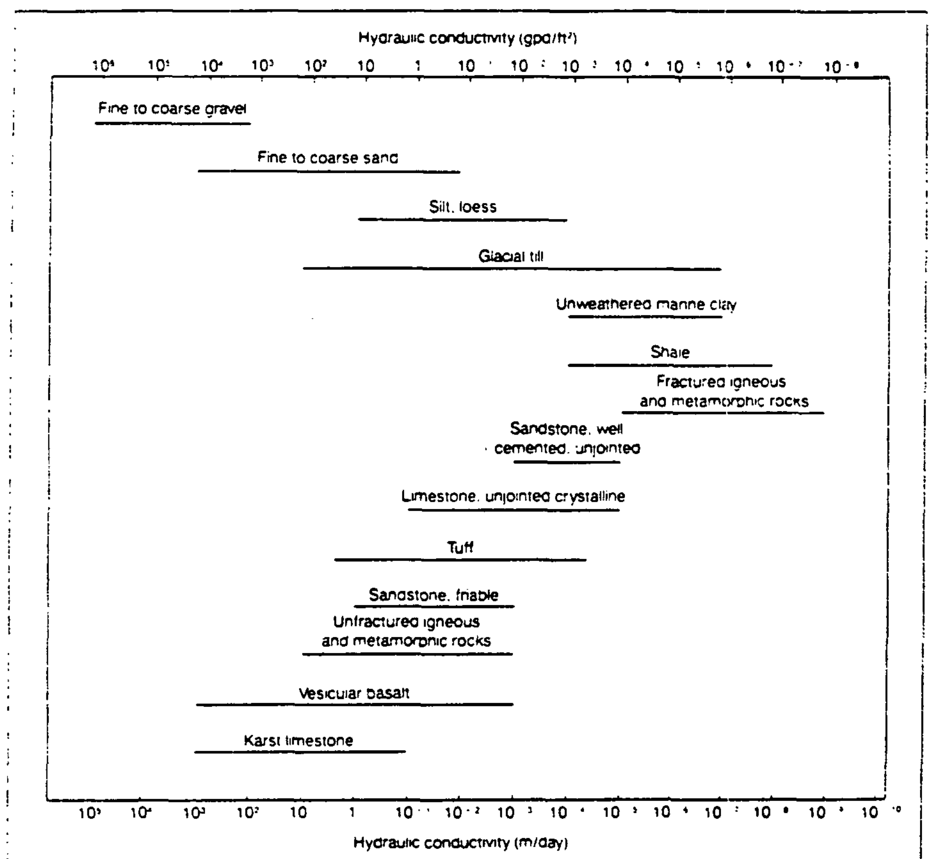


NOTES: Transmissivity (T) = KM where
K = Permeability
M = Saturated thickness of the aquifer
Specific capacity values based on pumping period of approximately 8-hours but are otherwise generalized.

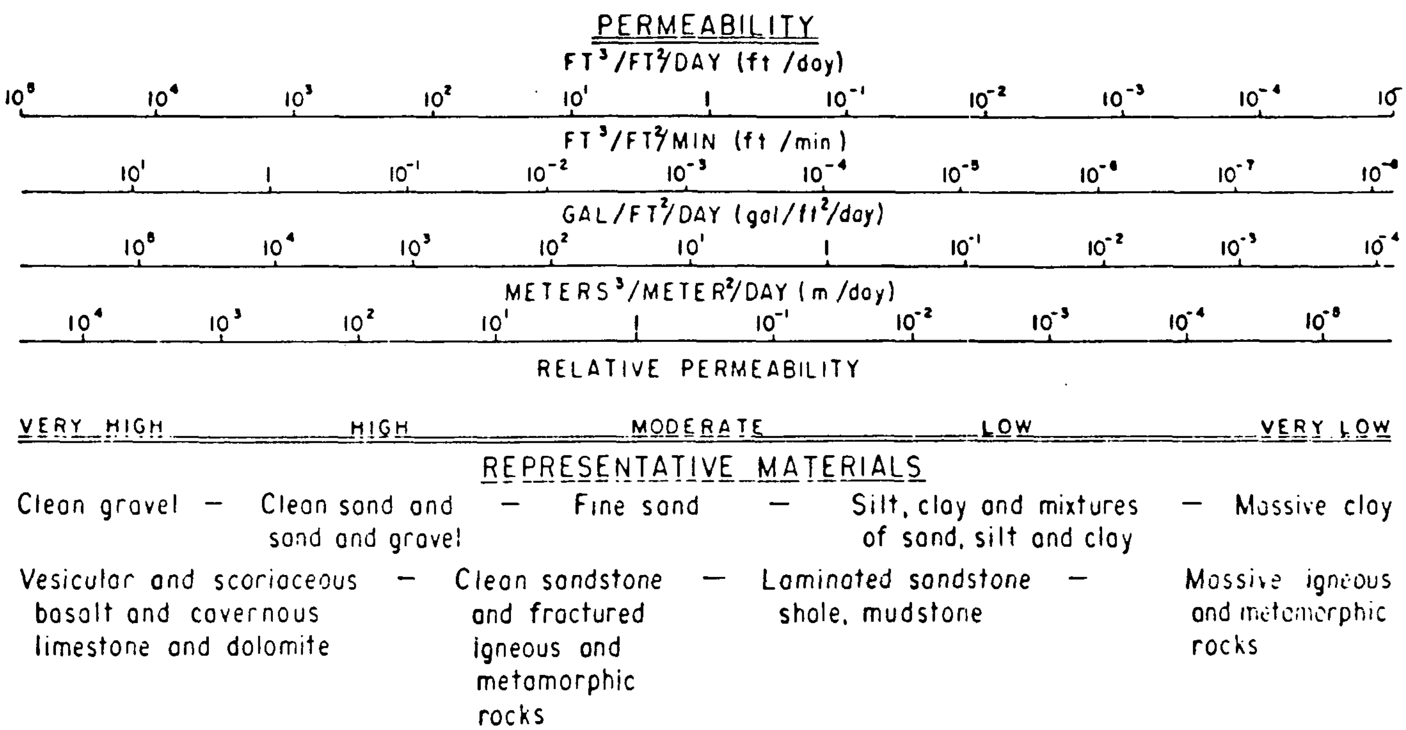
Comparison of transmissivity, specific capacity, and well potential. 103-D-1406.

Attachment 8

Hydraulic Conductivity - Aquifer Material
Comparison Charts (2)



Typical *K* values for consolidated and unconsolidated aquifers. *(After Davis, 1969; Dunn and Leopold, 1978; Freeze and Cherry, 1979).*



Comparison of permeability and representative aquifer materials. 103-D-1407.

Attachment 9

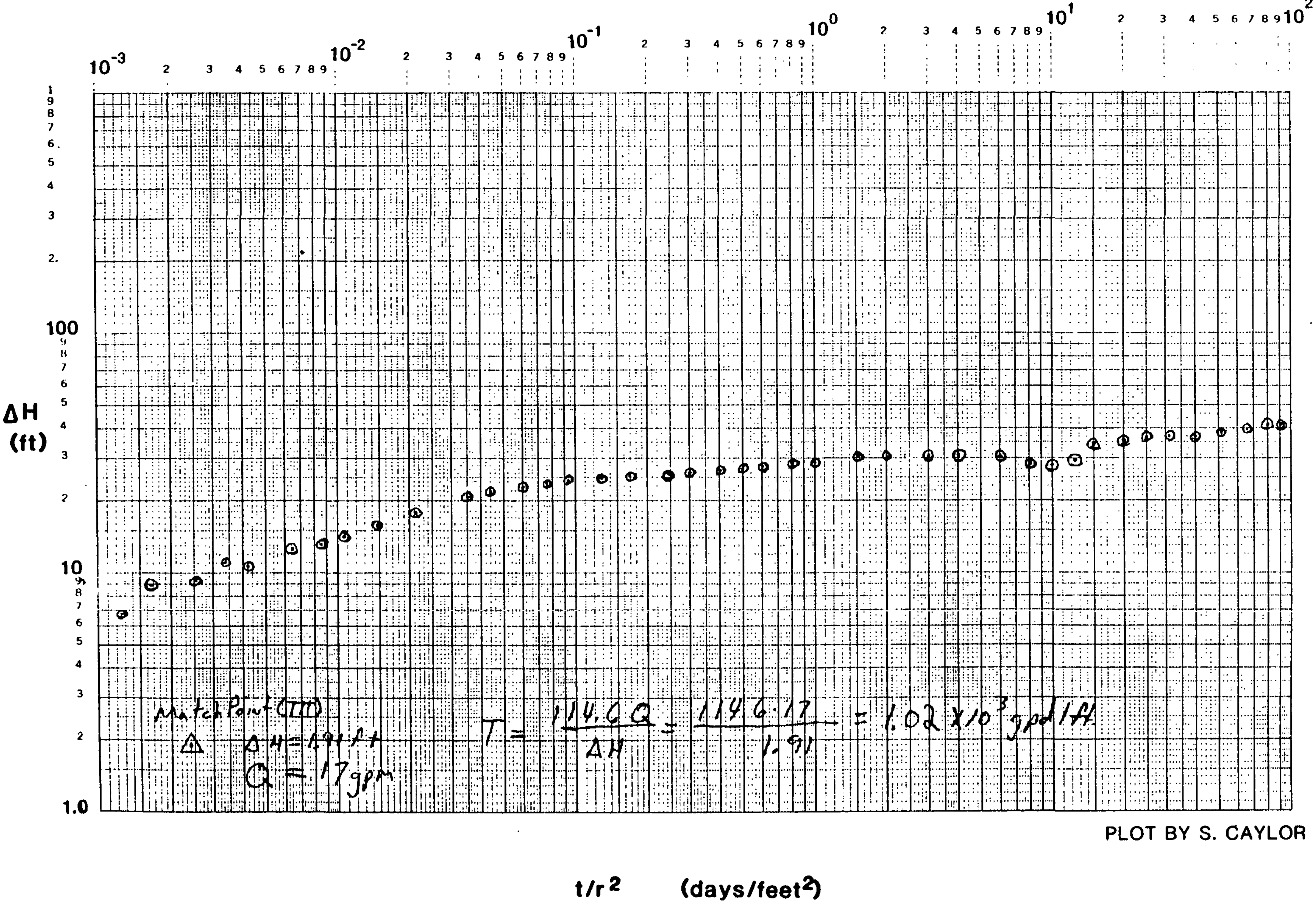
REI 10-1 Run #2 Pumping Test
Response Curves and Aquifer
Characteristics Calculations

K•Σ LOGARITHMIC 3 × 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 10-1

10/7/86

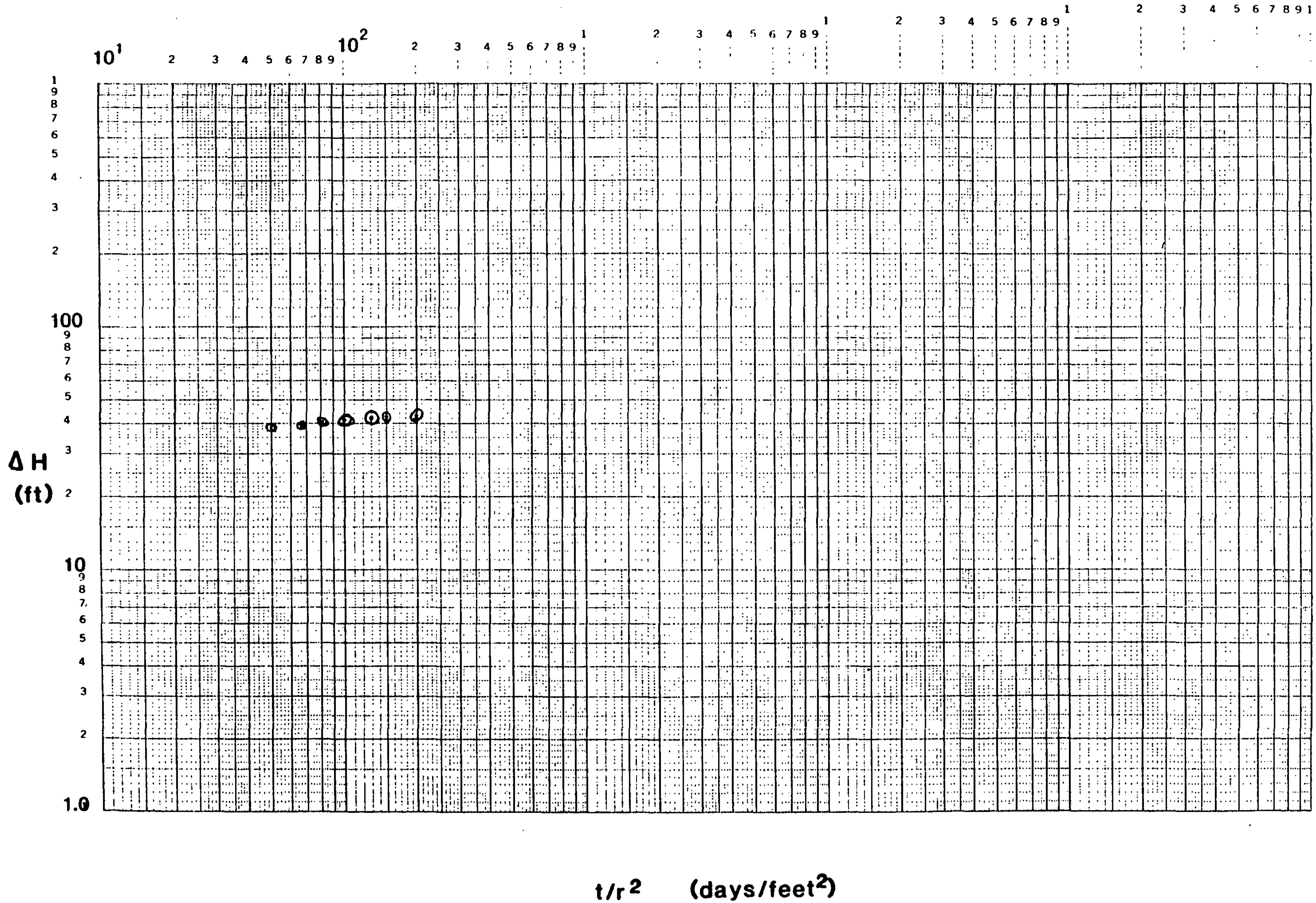


PLOT BY S. CAYLOR

K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 10-1 10/7/86



D.D 11-19-86

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ___

PROJECT: FRENCH LTD. JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 10-1

COMPUTED BY: PCM DATE: 11-13-86

CHECKED BY: DKG DATE: 11-14-86

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 1.91$ ft.

$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{1.91} = \boxed{1.02 \times 10^{3} \text{ gpd/ft.}}$$

$$\times \text{ Conversion Factor } 1.432 \times 10^{-7} = \boxed{1.47 \times 10^{-4} \text{ m}^2/\text{s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 2.40 \times 10^{-7}$ days/ft²

$T = \boxed{1.02 \times 10^{3} \text{ gpd/ft.}}$

$$S = \frac{(1)(1.02 \times 10^{3})(2.40 \times 10^{-7})}{1.87} = \boxed{1.31 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

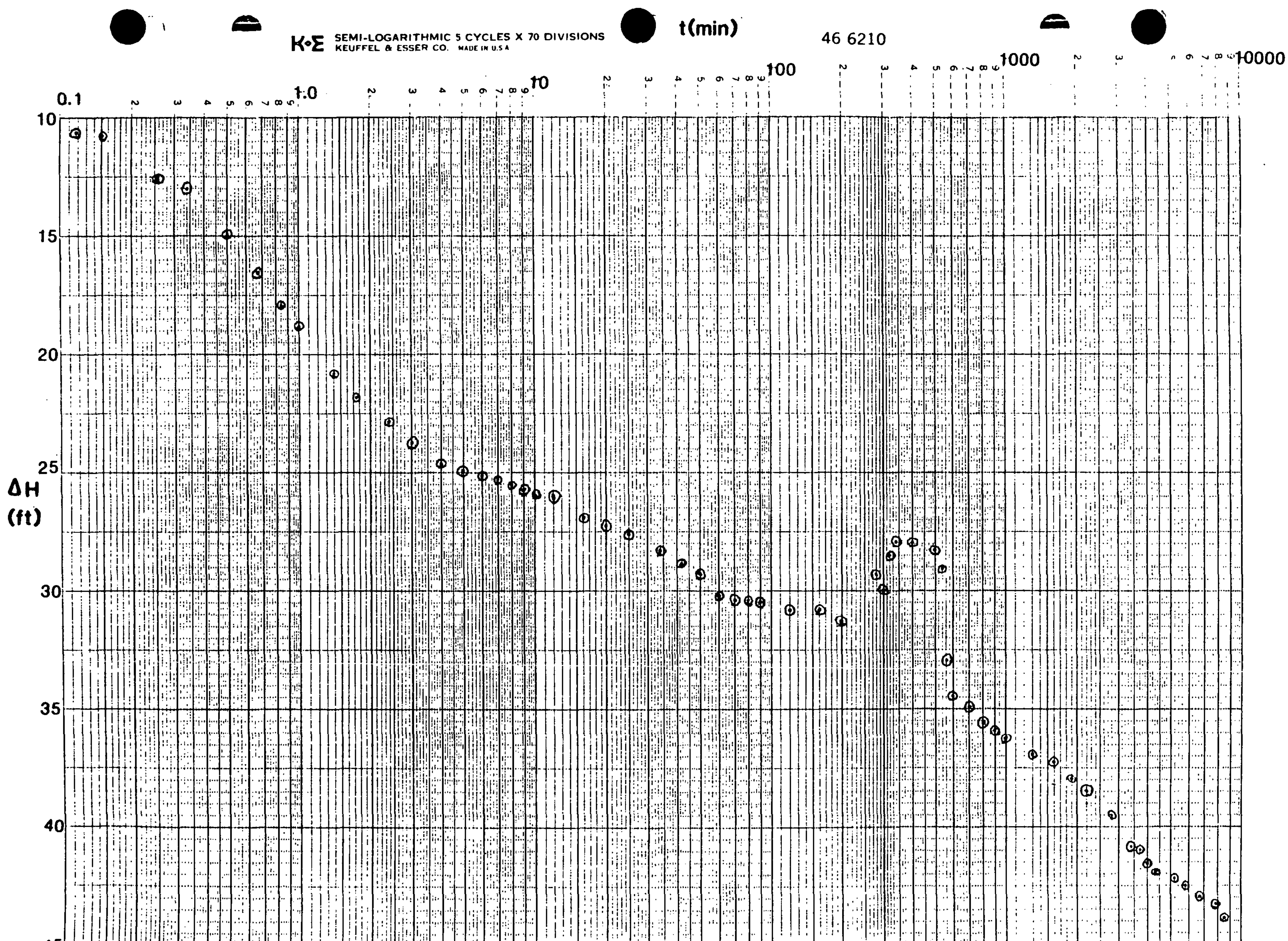
$T = \boxed{1.02 \times 10^{3} \text{ gpd/ft.}}$

$b = 25.30$ ft.

$$K = \frac{1.02 \times 10^{3}}{25.30} = \boxed{4.03 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.90 \times 10^{-3} \text{ cm/s}}$$

REI



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI 10-1 10/7/86

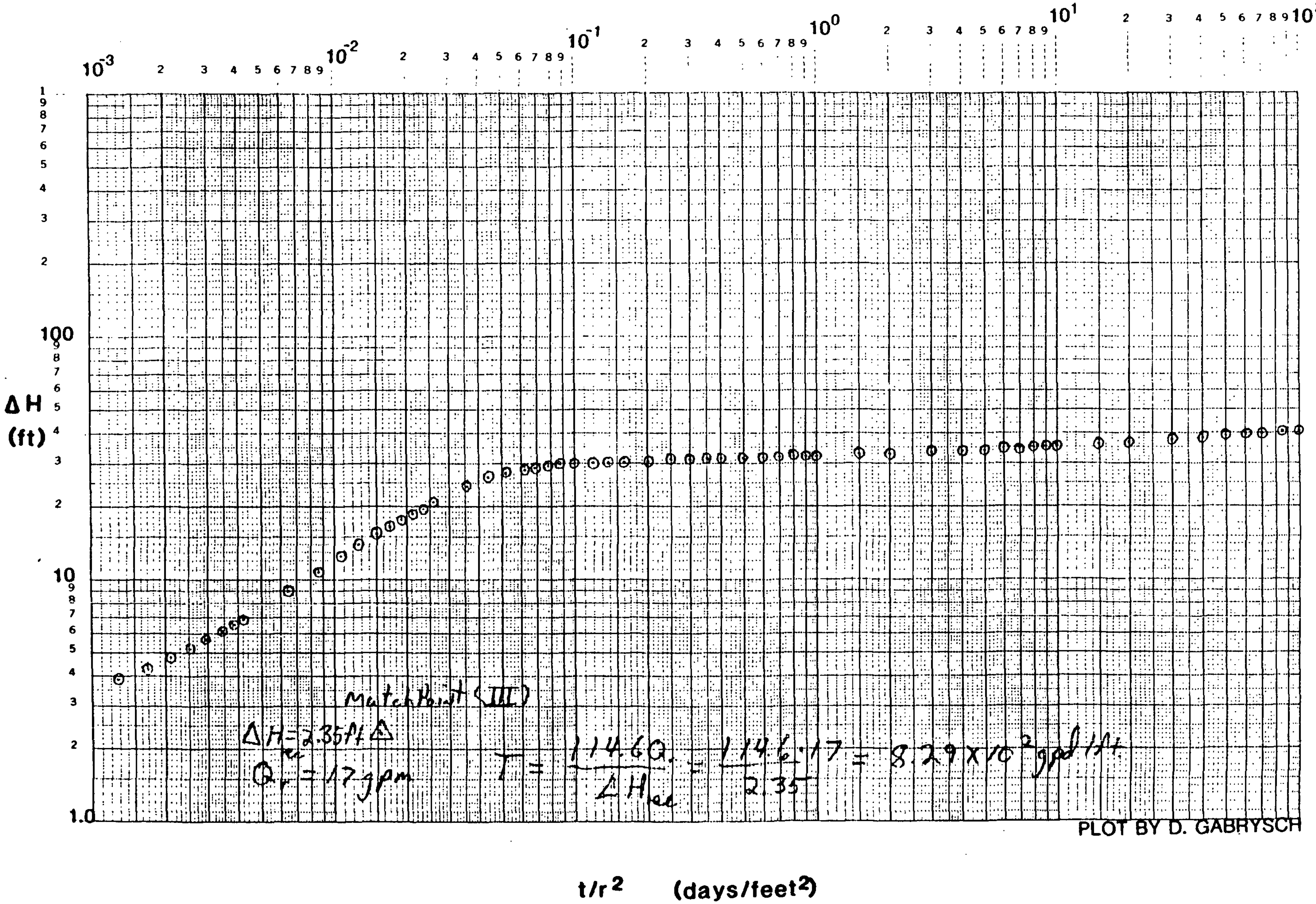
PLOT BY T. BOCCA

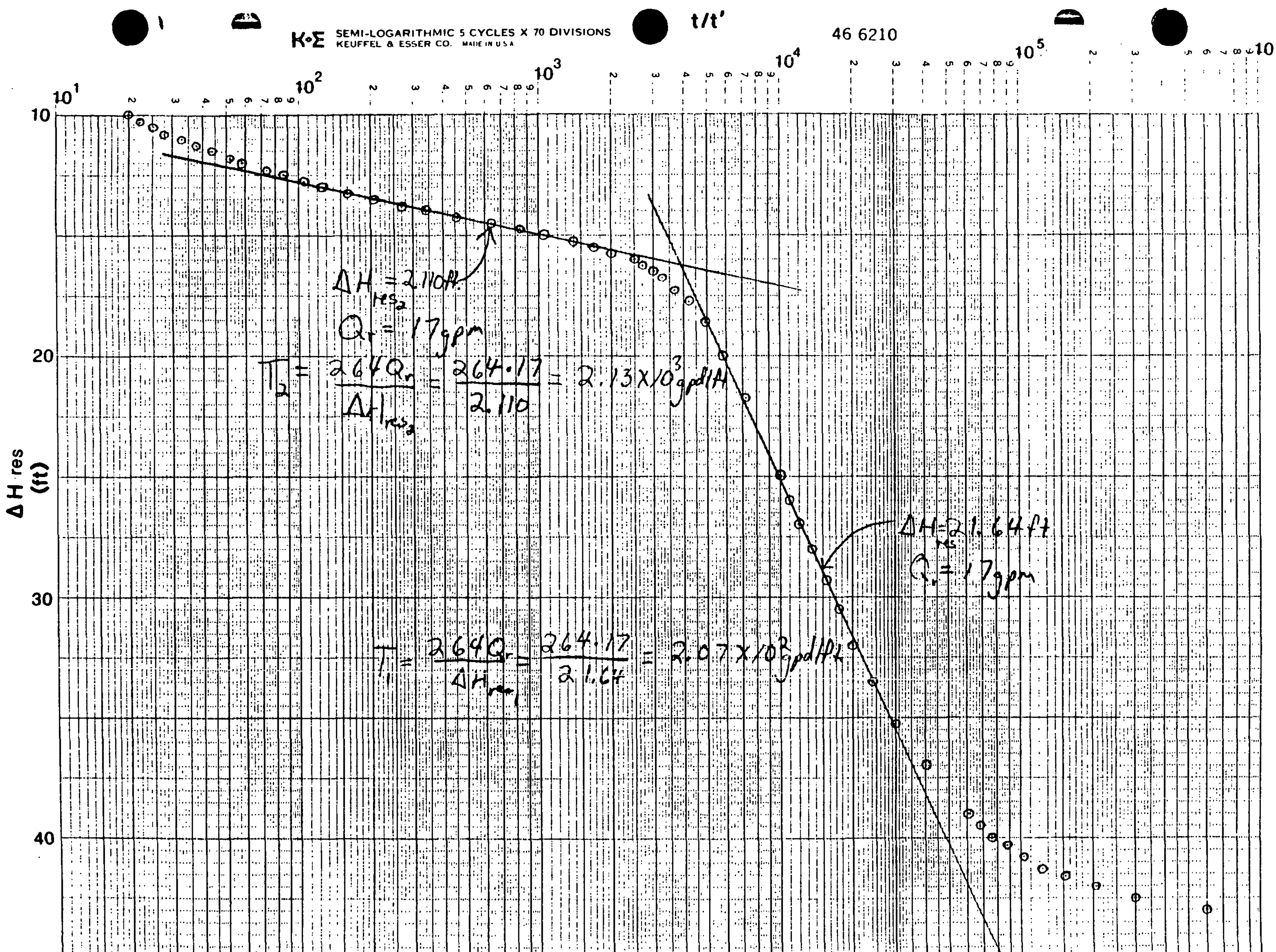
K&E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 10-1 RUN #2 PUMP TEST - RECOVERY

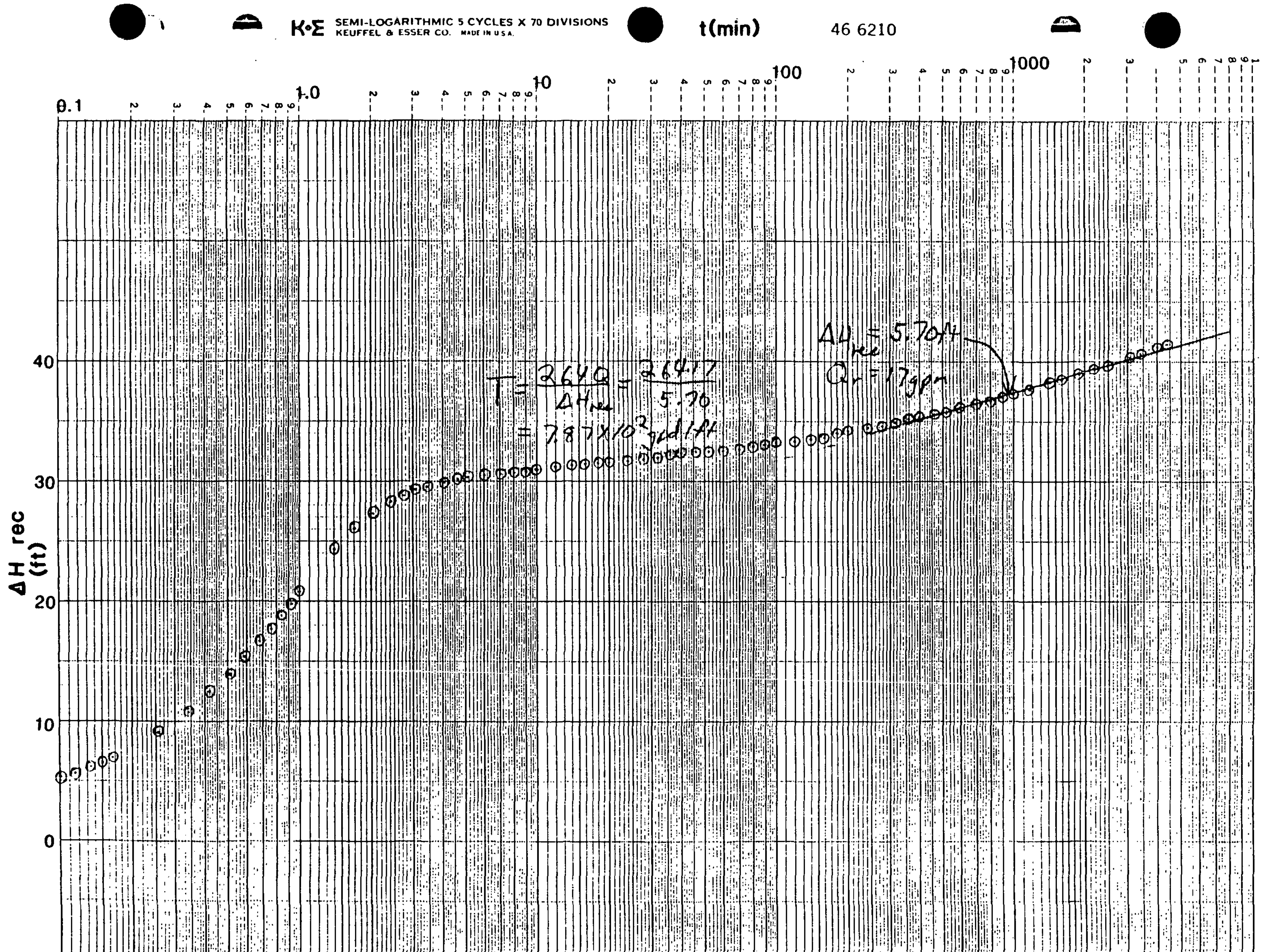
LOG-LOG PLOT OF REI 10-1 10/7/86





REI 10-1 RUN #2 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF REI 10-1 10/7/86

PLOT BY M. BARRON



REI 10-1 RUN #2 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF REI 10-1 10/7/86

PLOT BY D. GABRYSCH

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FFS [illegible] LTD. JOB NO.: 23<-14

SUBJECT: REI 10-1 Run #2 Calc for REI 10-1

COMPUTED BY: DRG DATE: 11-[illegible]

CHECKED BY: DD DATE: 11-19-85

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 2.35$ ft

$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{2.35} = \boxed{8.29 \times 10^{2} \text{ gpd/ft}}$$

x Conversion Factor 1.438×10^{-7} $\boxed{1.19 \times 10^{-4} \text{ m}^2/\text{s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{8.29 \times 10^{2} \text{ gpd/ft}}$

$b = 25.30$ ft

$$K = \frac{8.29 \times 10^{2}}{25.30} \quad \boxed{3.28 \times 10^{1} \text{ gpd/ft}^2}$$

x Conversion Factor 4.715×10^{-5} $\boxed{1.54 \times 10^{-3} \text{ cm/s}}$

Semi-Log(a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 17$ gpm

$\Delta H_{res_1} = 21.64$ ft $\quad T_1 = \frac{(264)(17)}{21.64} = \boxed{2.07 \times 10^{2} \text{ gpd/ft}}$

$\Delta H_{res_2} = 2.110$ ft $\quad T_2 = \frac{(264)(17)}{2.110} = \boxed{2.13 \times 10^{3} \text{ gpd/ft}}$

x Conversion Factor 1.438×10^{-7} = $\boxed{2.98 \times 10^{-5} \text{ m}^2/\text{s}}$ $\boxed{3.06 \times 10^{-4} \text{ m}^2/\text{s}}$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc for REI 10-1

COMPUTED BY: DRG DATE: 11-14-85

CHECKED BY: DD DATE: 11-19-85

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T_1 = \boxed{2.07 \times 10^2 \text{ gpd/ft}}$

$b = 25.30 \text{ ft}$

$K_1 = \frac{2.07 \times 10^2}{25.30} = \boxed{8.18 \times 10^0 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $= \boxed{3.86 \times 10^{-4} \text{ cm/s}}$

$T_2 = \boxed{2.13 \times 10^3 \text{ gpd/ft}}$

$b = 25.30 \text{ ft}$

$K_2 = \frac{2.13 \times 10^3}{25.30} = \boxed{8.42 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $= \boxed{3.97 \times 10^{-3} \text{ cm/s}}$

Semi-Log (L) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264 Q}{\Delta H_{rec}}$

$Q = 17 \text{ gpm}$

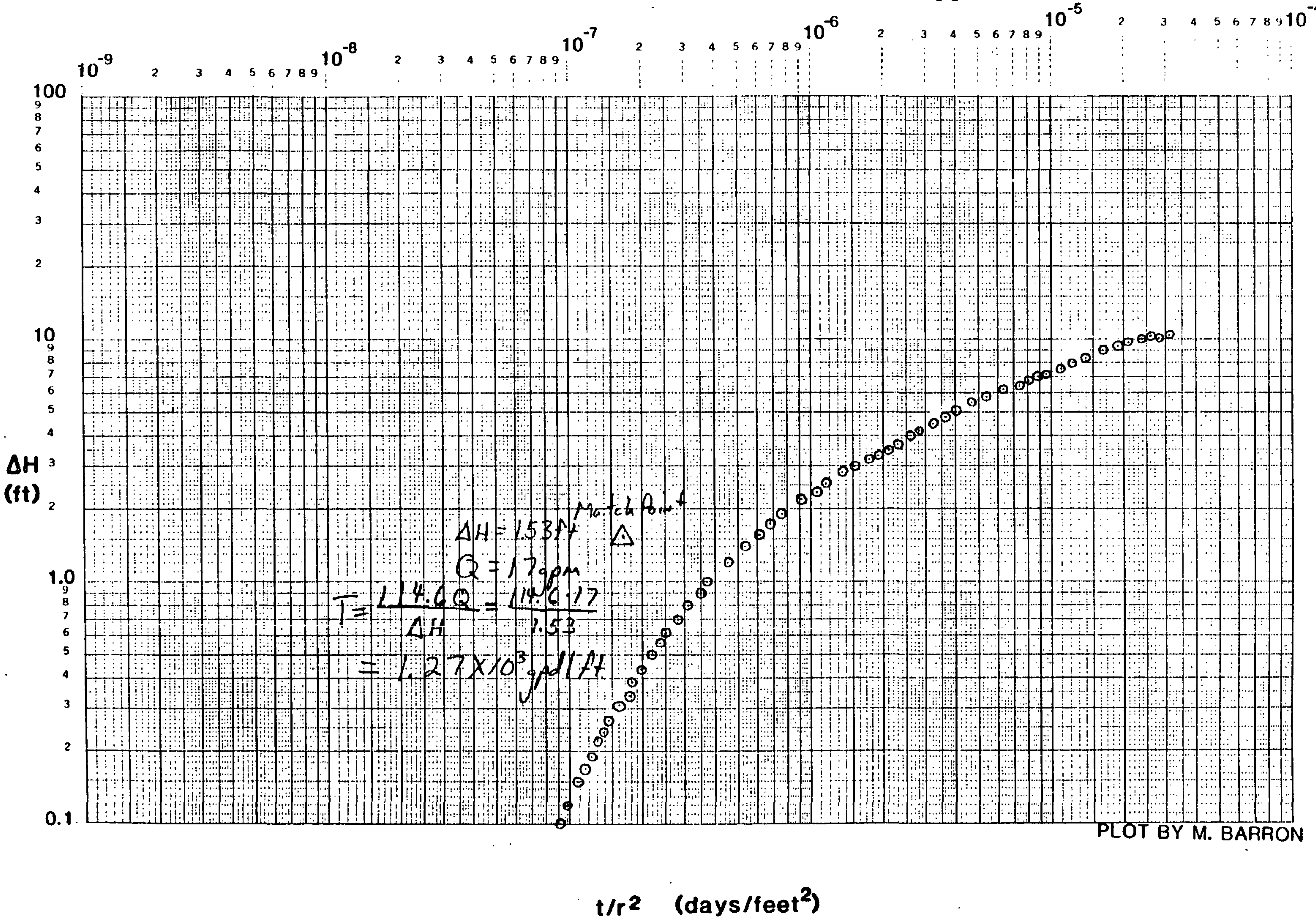
$\Delta H_{rec} = 5.70 \text{ ft}$ $T = \frac{(264)(17)}{5.70} = \boxed{7.87 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} $= \boxed{1.13 \times 10^{-4} \text{ m}^2\text{/s}}$

ERT

K•E LOGARITHMIC 3 x 5 CYCLES KEUFFEL & ESSER CO. MADE IN U.S.A. 46 7520

REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 11 10/7/86



CALCULATIONS AND COMPUTATIONS

SHEET 6 OF ____

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 11

COMPUTED BY: DRG DATE: 11-13-8

CHECKED BY: DD DATE: 11-17-8

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 1.53$ ft.

$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{1.53} = \boxed{1.27 \times 10^3 \text{ gpd/ft.}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.83 \times 10^{-4} \text{ m}^2/\text{s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 1.68 \times 10^{-7}$ days/ft²

$T = \boxed{1.27 \times 10^3 \text{ gpd/ft.}}$

$$S = \frac{(1)(1.27 \times 10^3)(1.68 \times 10^{-7})}{1.87} = \boxed{1.14 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

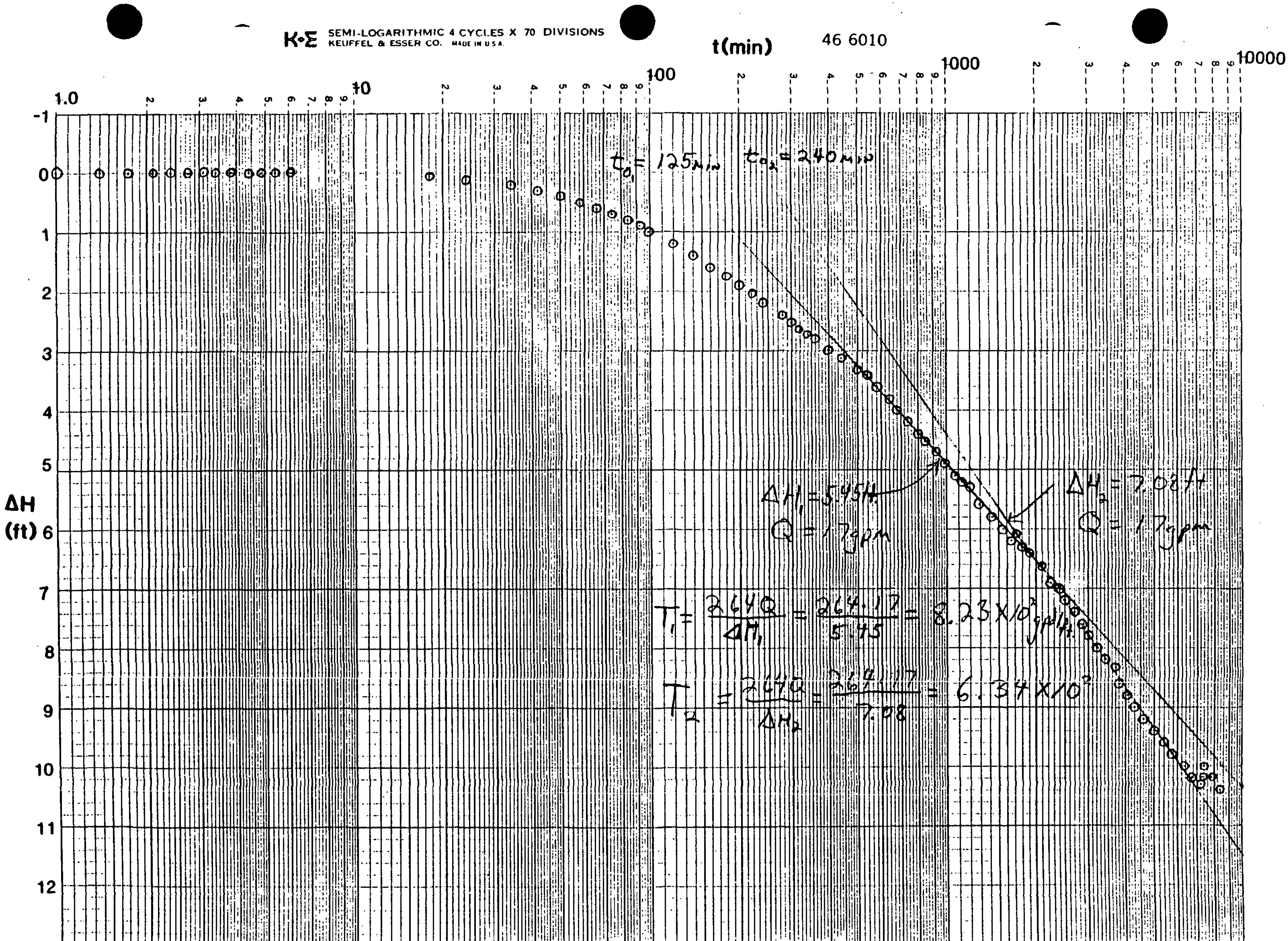
$T = \boxed{1.27 \times 10^3 \text{ gpd/ft.}}$

$b = 16.45$ ft

$$K = \frac{1.27 \times 10^3}{16.45} = \boxed{7.72 \times 10^1 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{3.64 \times 10^{-3} \text{ cm/s}}$$

REI



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI 11 10/7/86

PLOT BY M. BARRON

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD — JOB NO.: 275-14

SUBJECT: REI 10-1 Run # 2 Calc for REI 11

COMPUTED BY: PCM DATE: 11-13-81

CHECKED BY: DRG DATE: 11-14-81

DD 11-19-81

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 17$ gpm

$\Delta H_1 = 5.45$ ft. $\quad T_1 = \frac{264(17)}{5.45} = \boxed{8.24 \times 10^2 \text{ gpd/ft}}$

$\Delta H_2 = 7.08$ ft. $\quad T_2 = \frac{264(17)}{7.08} = \boxed{6.34 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} = $\boxed{1.18 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{9.12 \times 10^{-5} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T\,t_o}{r^2}$$

$r = 427.782$ ft.

$t_{o_1} = 125 \text{ min.}/1440 = 8.68 \times 10^{-2}$ days

$T_1 = \boxed{8.24 \times 10^2 \text{ gpd/ft}}$

$t_{o_2} = 240 \text{ min.}/1440 = 1.67 \times 10^{-1}$ days

$T_2 = \boxed{6.34 \times 10^2 \text{ gpd/ft.}}$

$$S_1 = \frac{(0.3)(8.24 \times 10^2)(8.68 \times 10^{-2})}{(427.782)^2} = \boxed{1.17 \times 10^{-4}}$$

$$S_2 = \frac{(0.3)(6.34 \times 10^2)(1.67 \times 10^{-1})}{(427.782)^2} = \boxed{1.74 \times 10^{-4}}$$

REI

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI IC-1 Run#2 Calc. for REI 11

COMPUTED BY: PCM DATE: 11-13-86

CHECKED BY: DRG DATE: 11-14-86
DD 11-15-8?

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T_1 = \boxed{8.24 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{8.24 \times 10^2}{16.45}$ $\boxed{5.01 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $\boxed{2.36 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{6.34 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{6.34 \times 10^2}{16.45}$ $\boxed{3.85 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $\boxed{1.82 \times 10^{-3} \text{ cm/s}}$

REI

K·E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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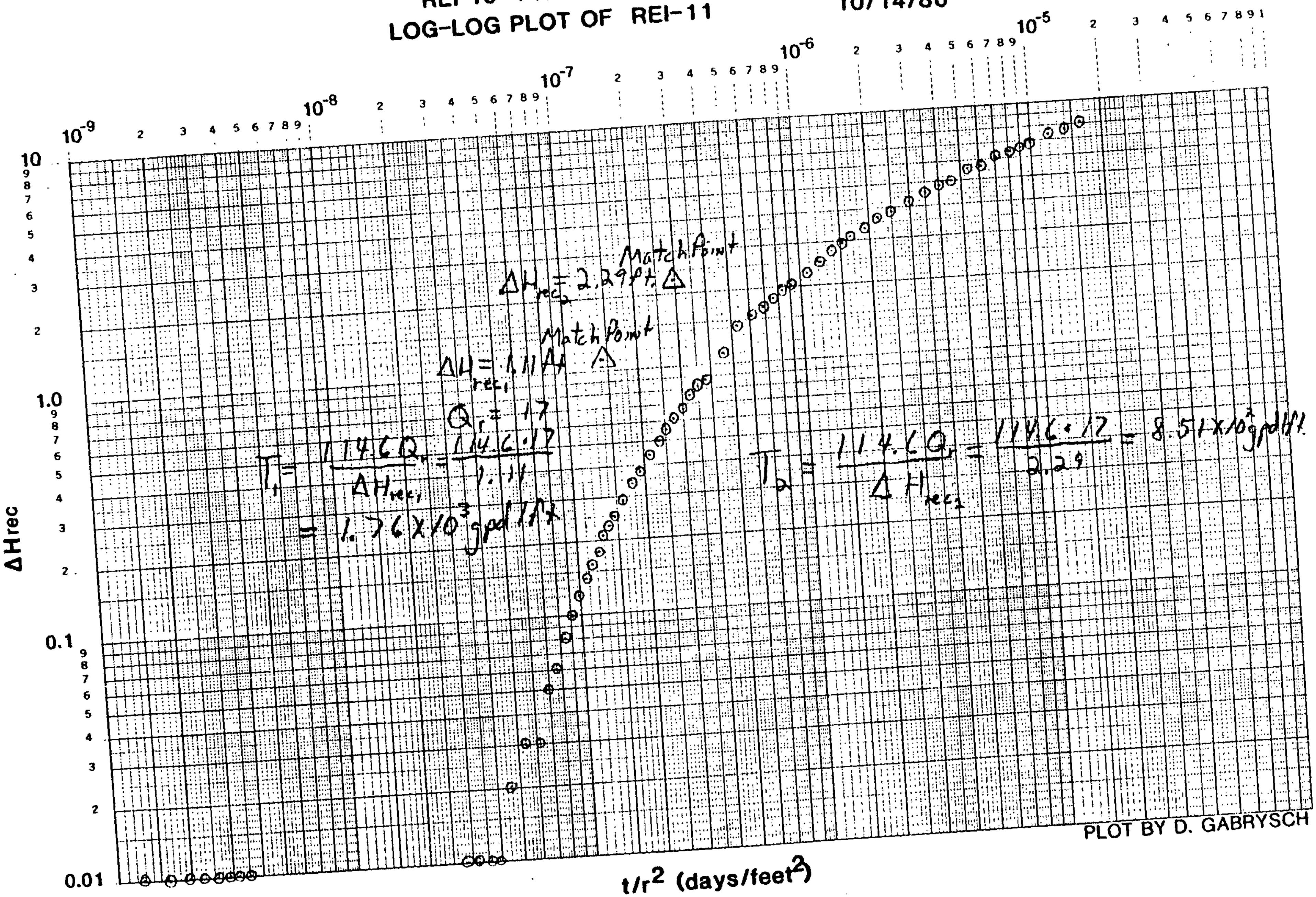
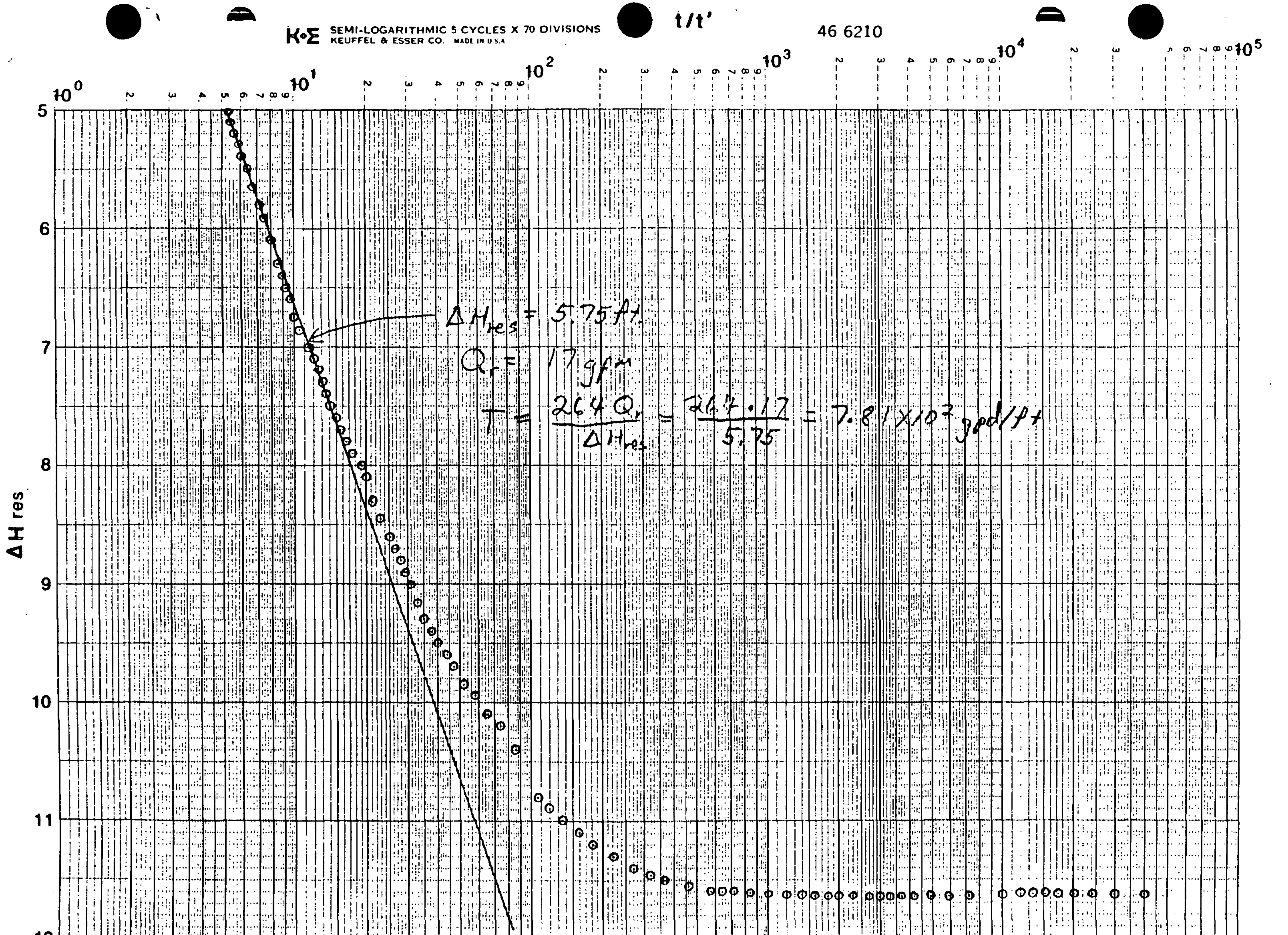
REI 10-1 RUN #2 PUMP TEST - RECOVERY

10/14/86

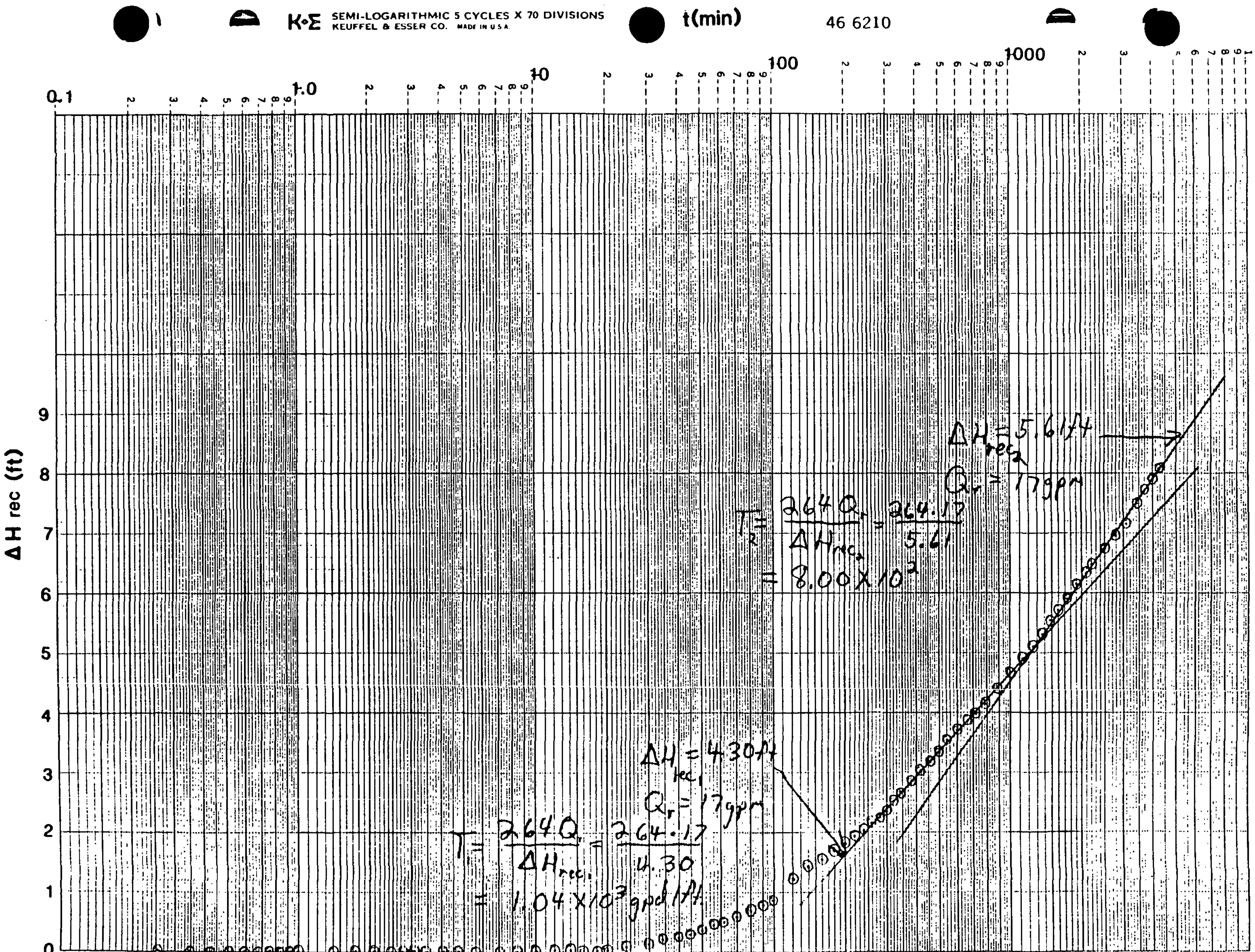
LOG-LOG PLOT OF REI-11





REI 10-1 RUN #2 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF REI-11 10/7/86

PLOT BY M. BARRON



REI 10-1 RUN #2 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF REI 11 10/7/86

PLOT BY D. GABRYSCH

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc for REI 11

COMPUTED BY: DRG DATE: 11-14-86

CHECKED BY: DD DATE: 11-17-86

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.60\ W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 17$ gpm

$\Delta H_1 = 1.11$ ft $\quad T_1 = \frac{(114.6)(17)}{1.11} = \boxed{1.76 \times 10^3 \text{ gpd/ft}}$

$\Delta H_2 = 2.29$ ft $\quad T_2 = \frac{(114.6)(17)}{2.29} = \boxed{8.51 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{2.53 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{1.22 \times 10^{-4} \text{ m}^2/\text{s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T_1 = \boxed{1.76 \times 10^3 \text{ gpd/ft}}$

$b = 16.45$ ft

$K_1 = \frac{1.76 \times 10^3}{16.45} = \boxed{1.07 \times 10^2 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} = $\boxed{5.04 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{8.51 \times 10^2 \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{8.51 \times 10^2}{16.45} = \boxed{5.17 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} = $\boxed{2.44 \times 10^{-3} \text{ cm/s}}$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc for REI 11

COMPUTED BY: DGG DATE: 11-14-83

CHECKED BY: ______ DATE: ______

Semi-Log(a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H_{res}}$$

$Q = 17$ gpm

$\Delta H_{res} = 5.75$ ft $\quad T = \frac{(264)(17)}{5.75} = \boxed{7.81 \times 10^{2} \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} $\boxed{1.12 \times 10^{-4} \text{ m}^2/\text{s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{7.81 \times 10^{2} \text{ gpd/ft}}$

$b = 16.45$ ft

$K = \frac{7.81 \times 10^{2}}{16.45} = \boxed{4.75 \times 10^{1} \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} = $\boxed{2.24 \times 10^{-3} \text{ cm/s}}$

Semi-Log(b) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H_{rec}}$$

$Q = 17$ gpm

$\Delta H_{rec_1} = 4.30$ ft $\quad T_1 = \frac{(264)(17)}{4.30} = \boxed{1.04 \times 10^{3} \text{ gpd/ft}}$

$\Delta H_{rec_2} = 5.61$ ft $\quad T_2 = \frac{(264)(17)}{5.61} = \boxed{8.00 \times 10^{2} \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{1.50 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{1.15 \times 10^{-4} \text{ m}^2/\text{s}}$

ERT

K+E LOGARITHMIC 3 x 5 CYCLES
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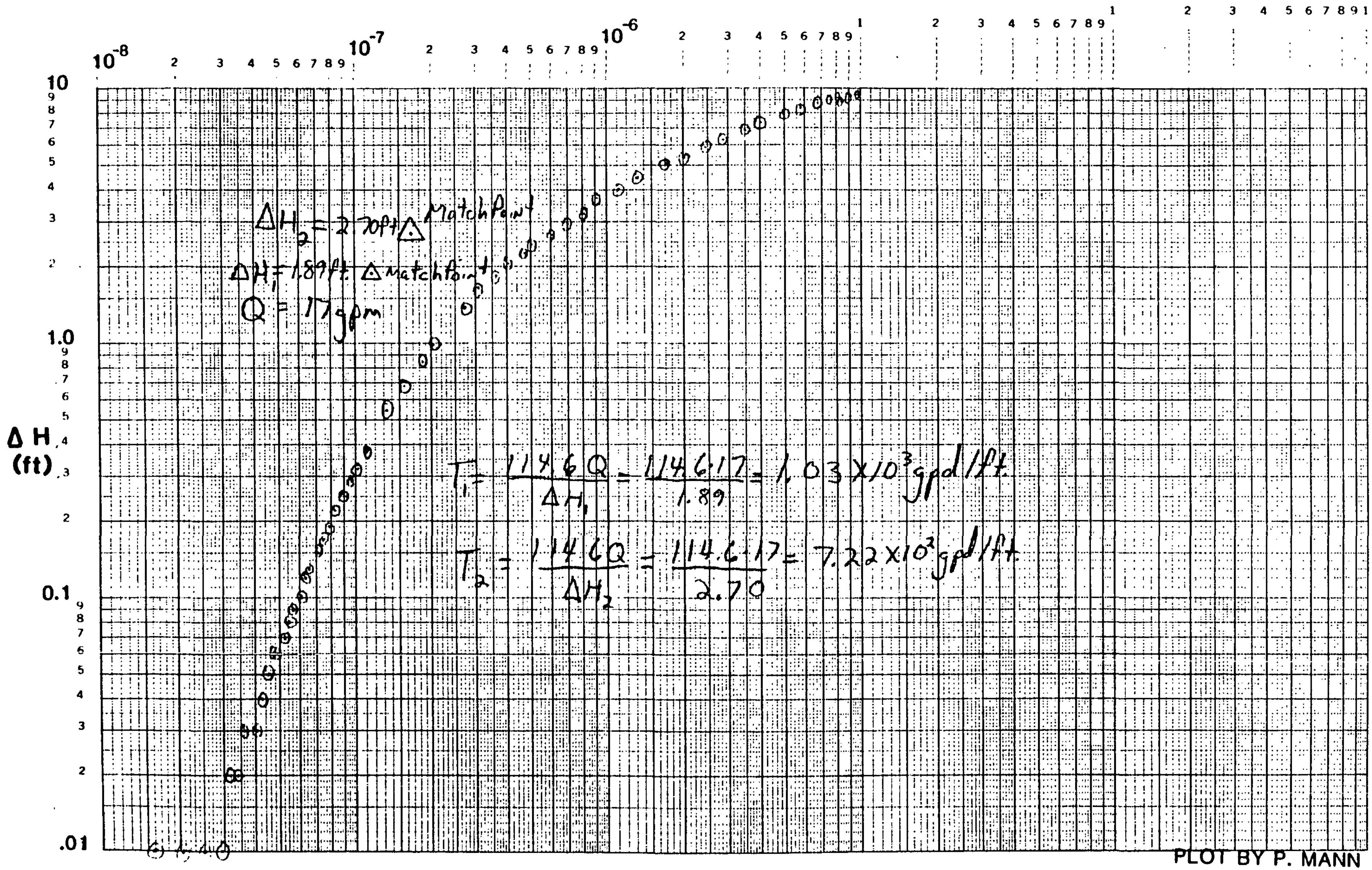
46 7520

REI 10-1 RUN #2 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-4 10/7/86



t/r^2 (days/feet^2)

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF ____

PROJECT: FRENCH LTD. JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 3-4

COMPUTED BY: DCG DATE: 11-12-85

CHECKED BY: AM DATE: 11-19-85

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 17$ gpm

$\Delta H_1 = 1.89$ ft. $\quad T_1 = \dfrac{(114.6)(17)}{1.89} = \boxed{1.03 \times 10^3 \text{ gpd/ft.}}$

$\Delta H_2 = 2.70$ ft. $\quad T_2 = \dfrac{(114.6)(17)}{2.70} = \boxed{7.22 \times 10^2 \text{ gpd/ft.}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{1.48 \times 10^{-4} \text{ m}^2/\text{s}}$ $\boxed{1.04 \times 10^{-4} \text{ m}^2/\text{s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$(t/r^2)_1 = 1.17 \times 10^{-7}$ days/ft²

$T_1 = \boxed{1.03 \times 10^3 \text{ gpd/ft.}}$

$S_1 = \dfrac{(1)(1.03 \times 10^3)(1.17 \times 10^{-7})}{1.87} = \boxed{6.44 \times 10^{-5}}$

$(t/r^2)_2 = 1.70 \times 10^{-7}$ days/ft²

$T_2 = \boxed{7.22 \times 10^2 \text{ gpd/ft.}}$

$S_2 = \dfrac{(1)(7.22 \times 10^2)(1.70 \times 10^{-7})}{1.87} = \boxed{6.56 \times 10^{-5}}$

REI

DD 11/15/86

CALCULATIONS AND COMPUTATIONS

SHEET 3 OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 3-4

COMPUTED BY: DRG DATE: 11-13-86

CHECKED BY: DD DATE: 11/15/86

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T_1 = \boxed{1.03 \times 10^3 \text{ gpd/ft.}}$

$b = 23.0$ ft.

$K_1 = \frac{1.03 \times 10^3}{23.0} = \boxed{4.48 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{2.11 \times 10^{-3} \text{ cm/s}}$

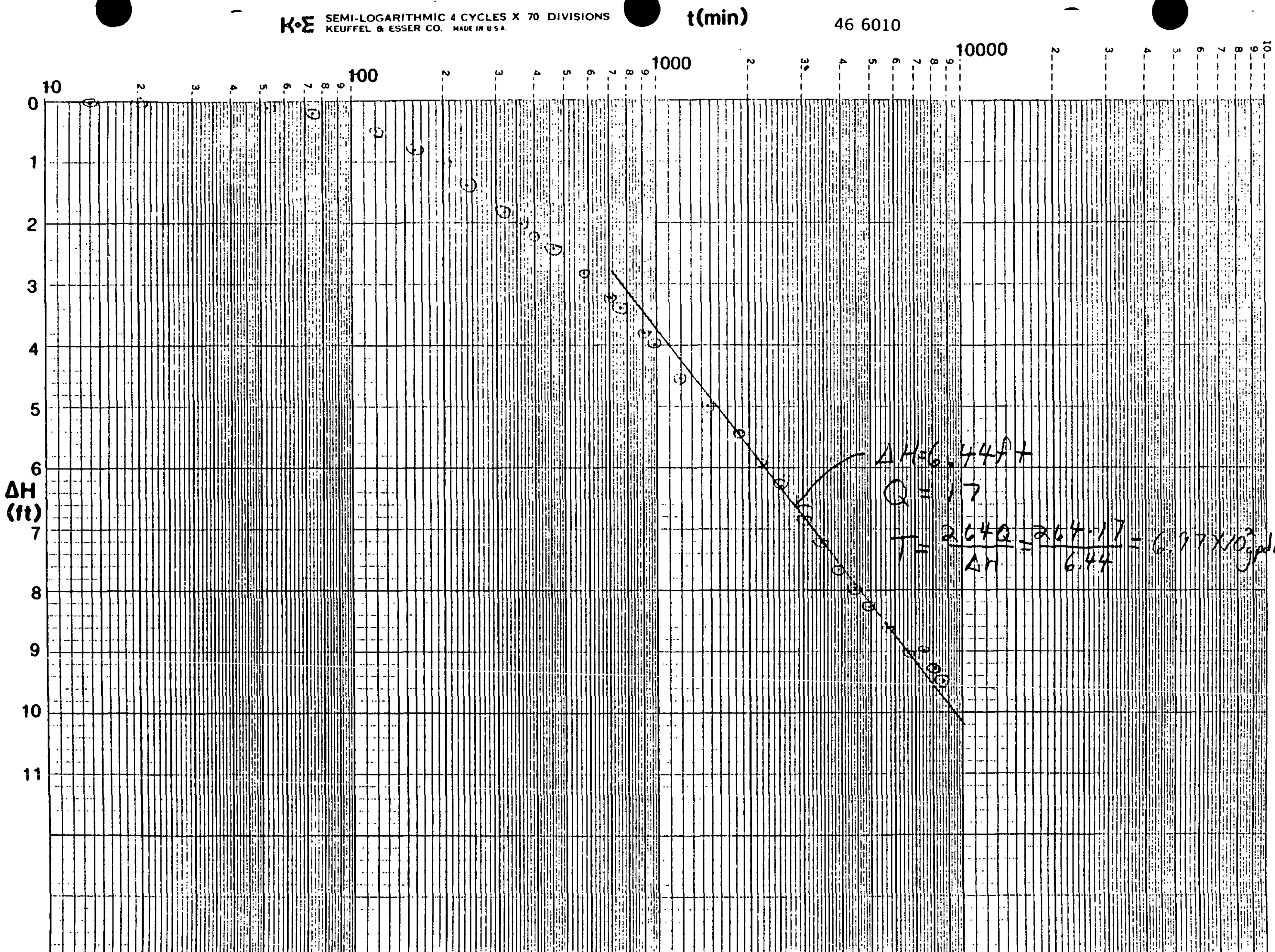
$T_2 = \boxed{7.22 \times 10^2 \text{ gpd/ft.}}$

$b = 23.0$ ft.

$K_2 = \frac{7.22 \times 10^2}{23.0} = \boxed{3.14 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{1.48 \times 10^{-3} \text{ cm/s}}$

REI



$T = \frac{264Q}{\Delta h} = \frac{264 \cdot 17}{6.44} = 6.97 \times 10^2$ gpd/ft

REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI 3-4 10/7/86

PLOT BY C. AREND

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 3-4

COMPUTED BY: DRG DATE: 11/14/86

CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 17$ gpm

$\Delta H = 6.44$ ft.

$$T = \frac{264(17)}{6.44} = \boxed{6.97 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.00 \times 10^{-4}\ m^2/s}$$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_0}{r^2}$$

$r = 784.360$ ft.

$t_0 = 265$ min./1440 $= 1.84 \times 10^{-1}$ days

$T = \boxed{6.97 \times 10^{2} \text{ gpd/ft.}}$

$$S = \frac{(0.3)(6.97 \times 10^{2})(1.84 \times 10^{-1})}{(784.360)^2} = \boxed{6.26 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{6.97 \times 10^{2} \text{ gpd/ft.}}$

$b = 23.0$ ft.

$$K = \frac{6.97 \times 10^{2}}{23.0} = \boxed{3.03 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.716 \times 10^{-5} = \boxed{1.43 \times 10^{-3} \text{ cm/s}}$$

REI

K+E LOGARITHMIC 3 x 5 CYCLES
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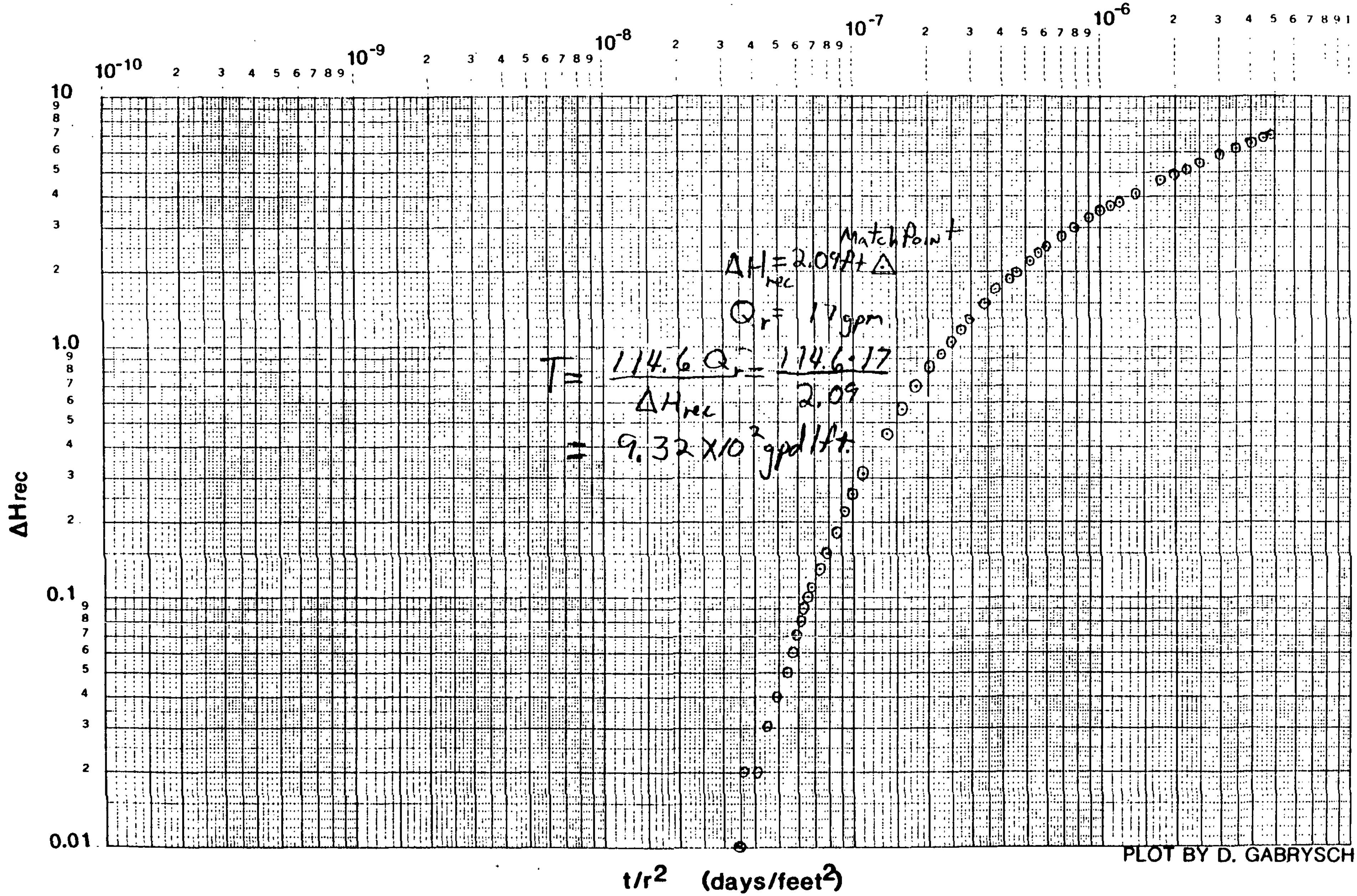
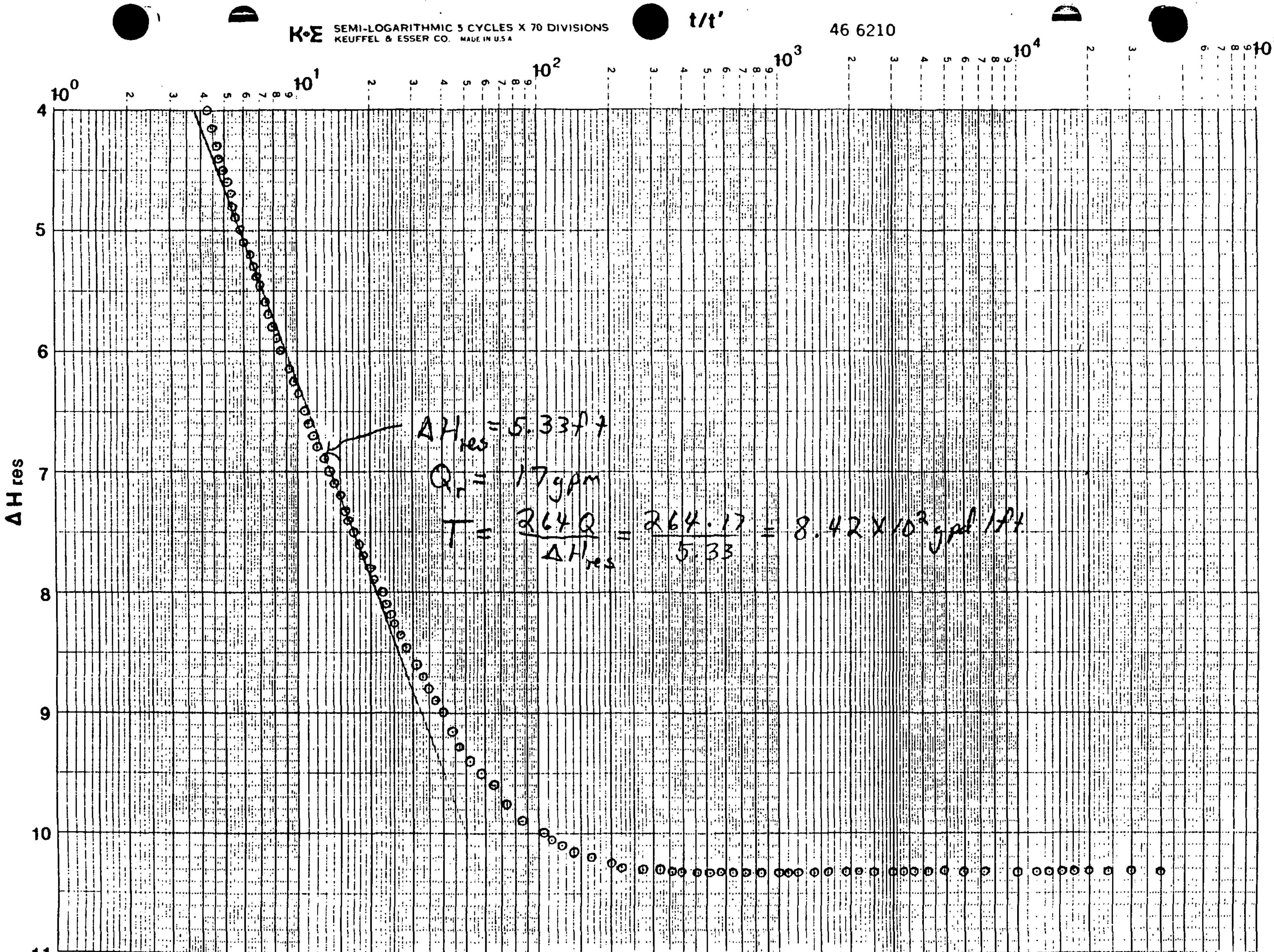
REI 10-1 RUN #2 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI 3-4 10/14/86



PLOT BY D. GABRYSCH

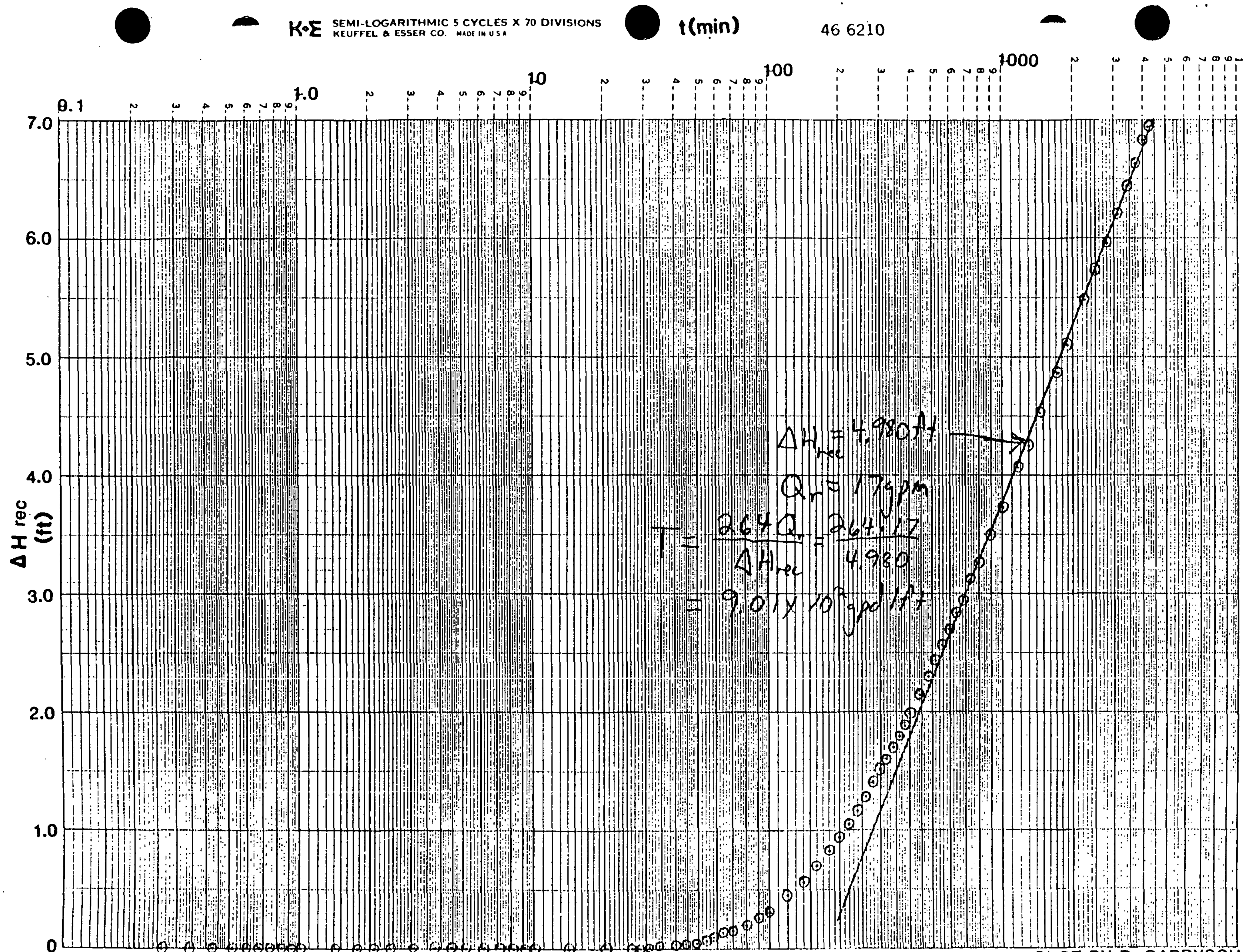


REI 10-1 RUN #2 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF REI 3-4

10/7/86

PLOT BY M. BARRON



REI 10-1 RUN #2 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF REI 3-4 10/7/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: Effling. LTD.

JOB NO.: 273-16

SUBJECT: PEI 10-1 Run #2 Calc for PEI 3-4

COMPUTED BY: DPC DATE: ____

CHECKED BY: DD DATE: 11-11-86

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 2.09$ ft
$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{2.09} = \boxed{9.32 \times 10^2 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.34 \times 10^{-4}\ m^2/s}$$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{9.32 \times 10^2 \text{ gpd/ft}}$

$b = 23.0$ ft

$$K = \frac{9.32 \times 10^2}{23.0} = \boxed{4.05 \times 10^1 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.91 \times 10^{-3} \text{ cm/s}}$$

Semi-Log (a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H_{res}}$$

$Q = 17$ gpm
$\Delta H_{res} = 5.33$ ft

$$T = \frac{(264)(17)}{5.33} = \boxed{8.42 \times 10^2 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{1.21 \times 10^{-4}\ m^2/s}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Run=2 Calc. for REI 3-4

COMPUTED BY: DCG DATE: 11-14-86

CHECKED BY: DD DATE: 11-19-86

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{8.42 \times 10^2 \text{ gpd/ft}}$

$b = 23.0$ ft

$K = \frac{8.42 \times 10^2}{23.0} = \boxed{3.66 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $= \boxed{1.73 \times 10^{-3} \text{ cm/s}}$

Semi-Log (b) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264 Q}{\Delta H_{rec}}$

$Q = 17$ gpm

$\Delta H_{rec} = 4.980$ ft $T = \frac{(264)(17)}{4.980} = \boxed{9.01 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} $= \boxed{1.30 \times 10^{-4} \text{ m}^2\text{/s}}$

ERT

K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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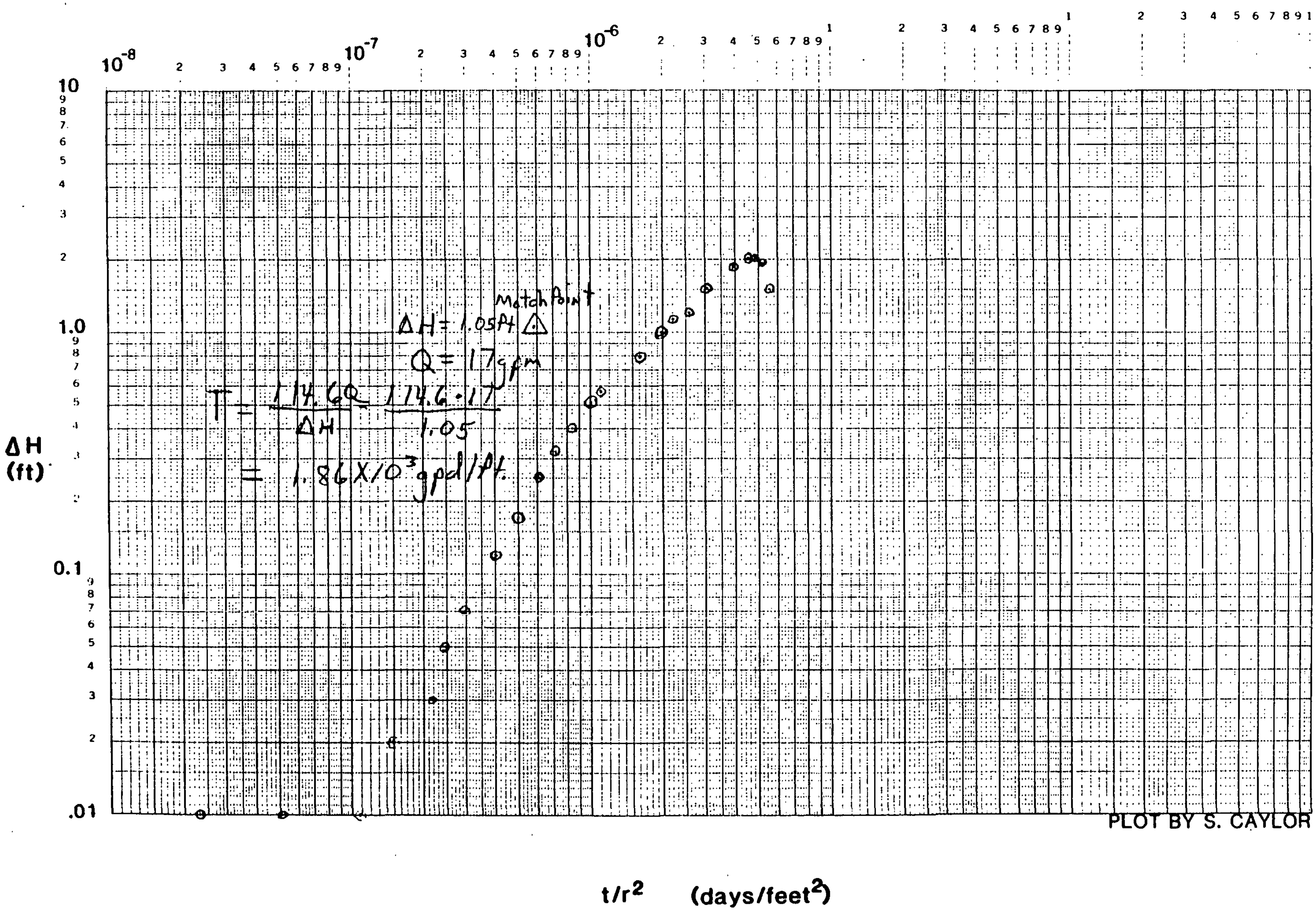
REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 7 10/7/86



CALCULATIONS AND COMPUTATIONS

SHEET 4 OF ____

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-2 Run #2 Calc. for REI 7

COMPUTED BY: DRG DATE: 11-13-8[illegible]

CHECKED BY: DD DATE: 11-15-8[illegible]

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 1.05$ ft.

$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{1.05} = \boxed{1.86 \times 10^{3} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{2.67 \times 10^{-4} \text{ m}^2/\text{s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 5.80 \times 10^{-7}$ days/ft^2

$T = \boxed{1.86 \times 10^{3} \text{ gpd/ft.}}$

$$S = \frac{(1)(1.86 \times 10^{3})(5.80 \times 10^{-7})}{1.87} = \boxed{5.77 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

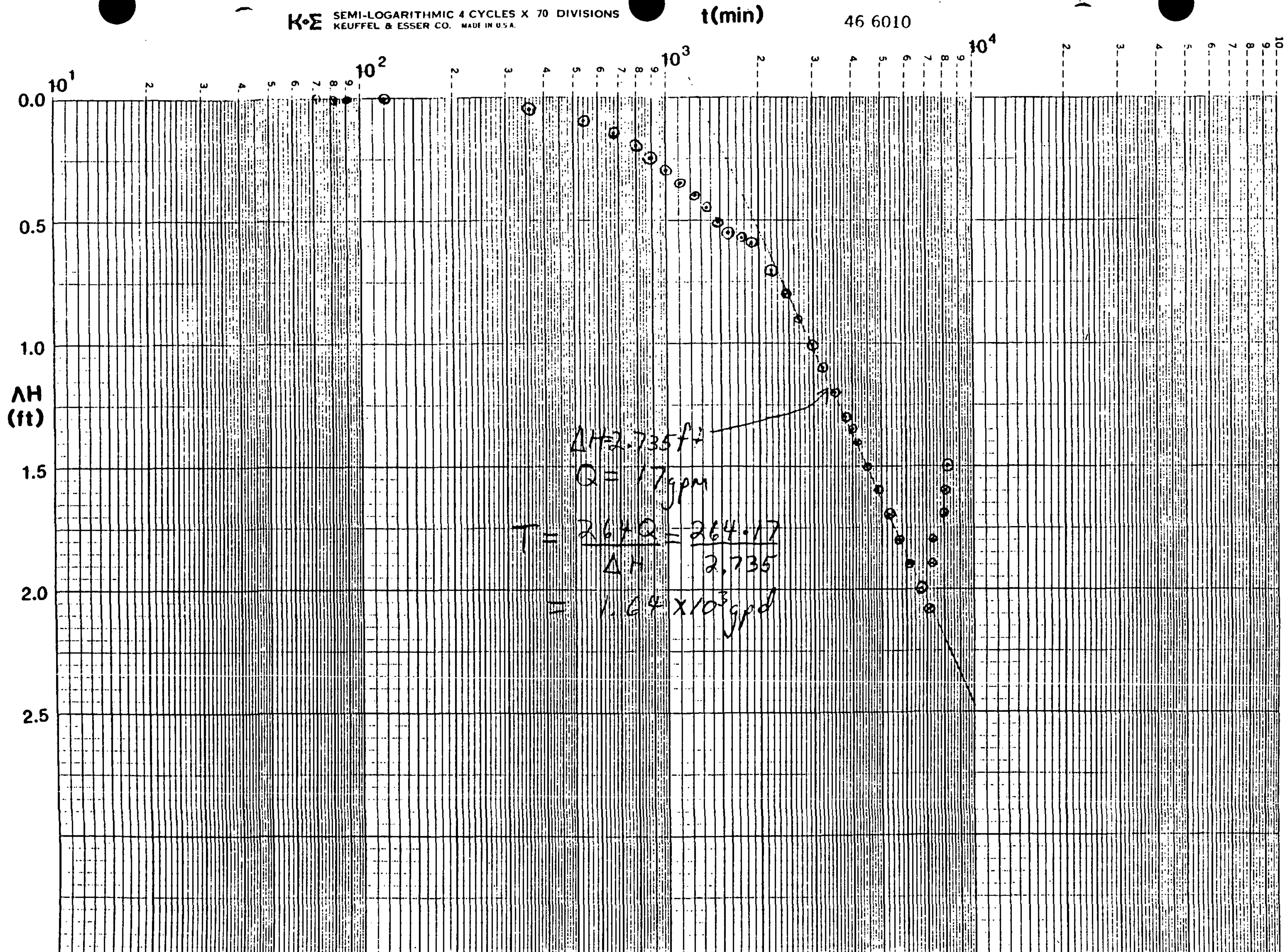
$T = \boxed{1.86 \times 10^{3} \text{ gpd/ft.}}$

$b = 15.0$ ft.

$$K = \frac{1.86 \times 10^{3}}{15.0} = \boxed{1.24 \times 10^{2} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{5.85 \times 10^{-3} \text{ cm/s}}$$

REI



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI-7 10/7/86

PLOT BY S. CAYLOR

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 10-1 Run # 2 Calc. for REI 7

COMPUTED BY: DRG DATE: 11/14/85

CHECKED BY: DD DATE: 11-15-85

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 17$ gpm

$\Delta H = 2.735$ ft.

$$T = \frac{264(17)}{2.735} = \boxed{1.64 \times 10^{3} \text{ gpd/ft.}}$$

$$\text{X Conversion Factor } 1.438 \times 10^{-7} = \boxed{2.36 \times 10^{-4} \ m^2/s}$$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_0}{r^2}$$

$r = 1012.704$ ft.

$t_0 = 1275$ min./1440 $= 8.85 \times 10^{-1}$ days

$T = \boxed{1.64 \times 10^{3} \text{ gpd/ft.}}$

$$S = \frac{(0.3)(1.64 \times 10^{3})(8.85 \times 10^{-1})}{(1012.704)^2} = \boxed{4.25 \times 10^{-4}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{1.64 \times 10^{3} \text{ gpd/ft.}}$

$b = 15.0$ ft.

$$K = \frac{1.64 \times 10^{3}}{15.0} = \boxed{1.09 \times 10^{2} \text{ gpd/ft}^2}$$

$$\text{X Conversion Factor } 4.715 \times 10^{-5} = \boxed{5.16 \times 10^{-3} \text{ cm/s}}$$

REI

K•E LOGARITHMIC 3 x 5 CYCLES
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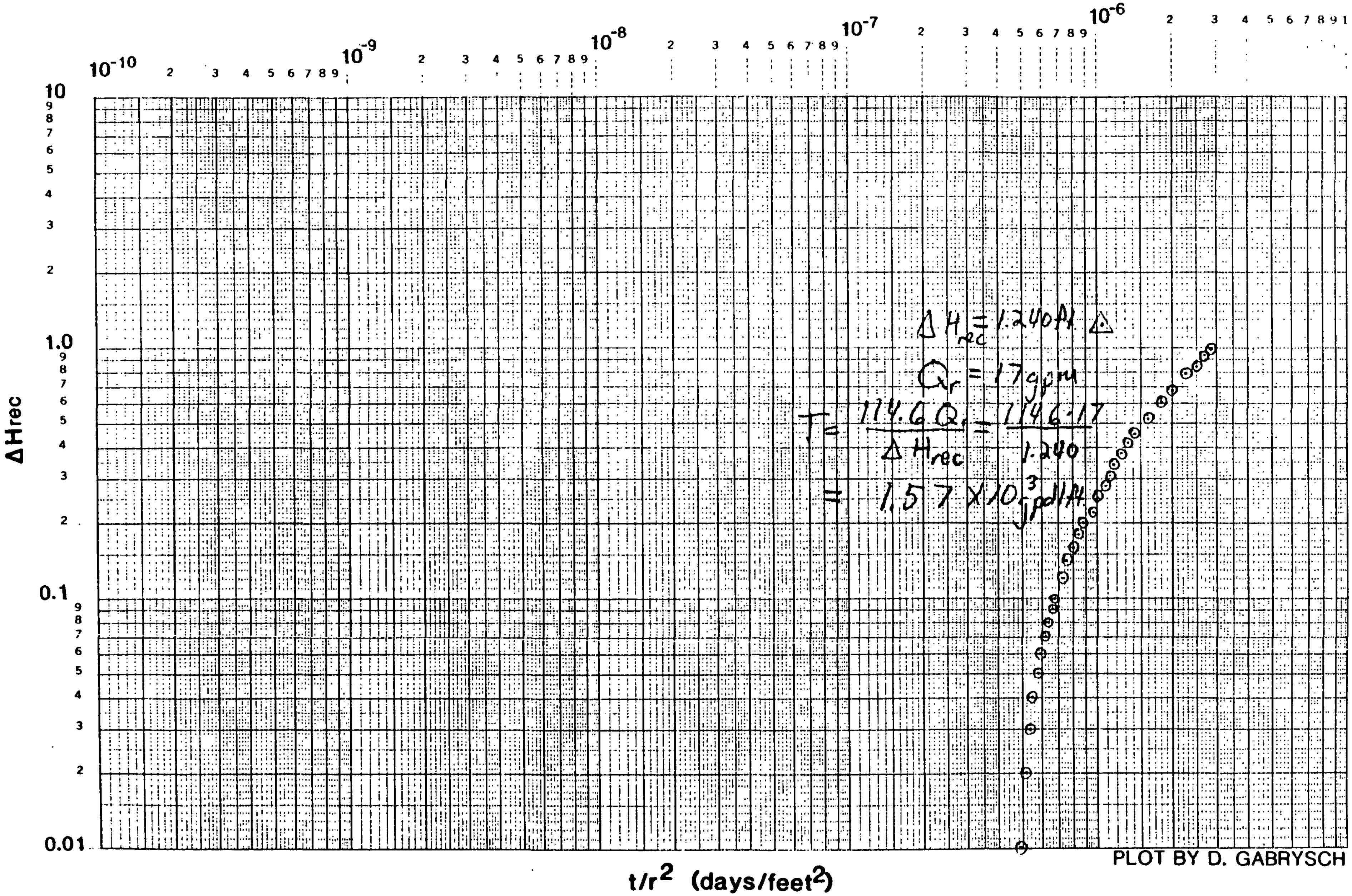
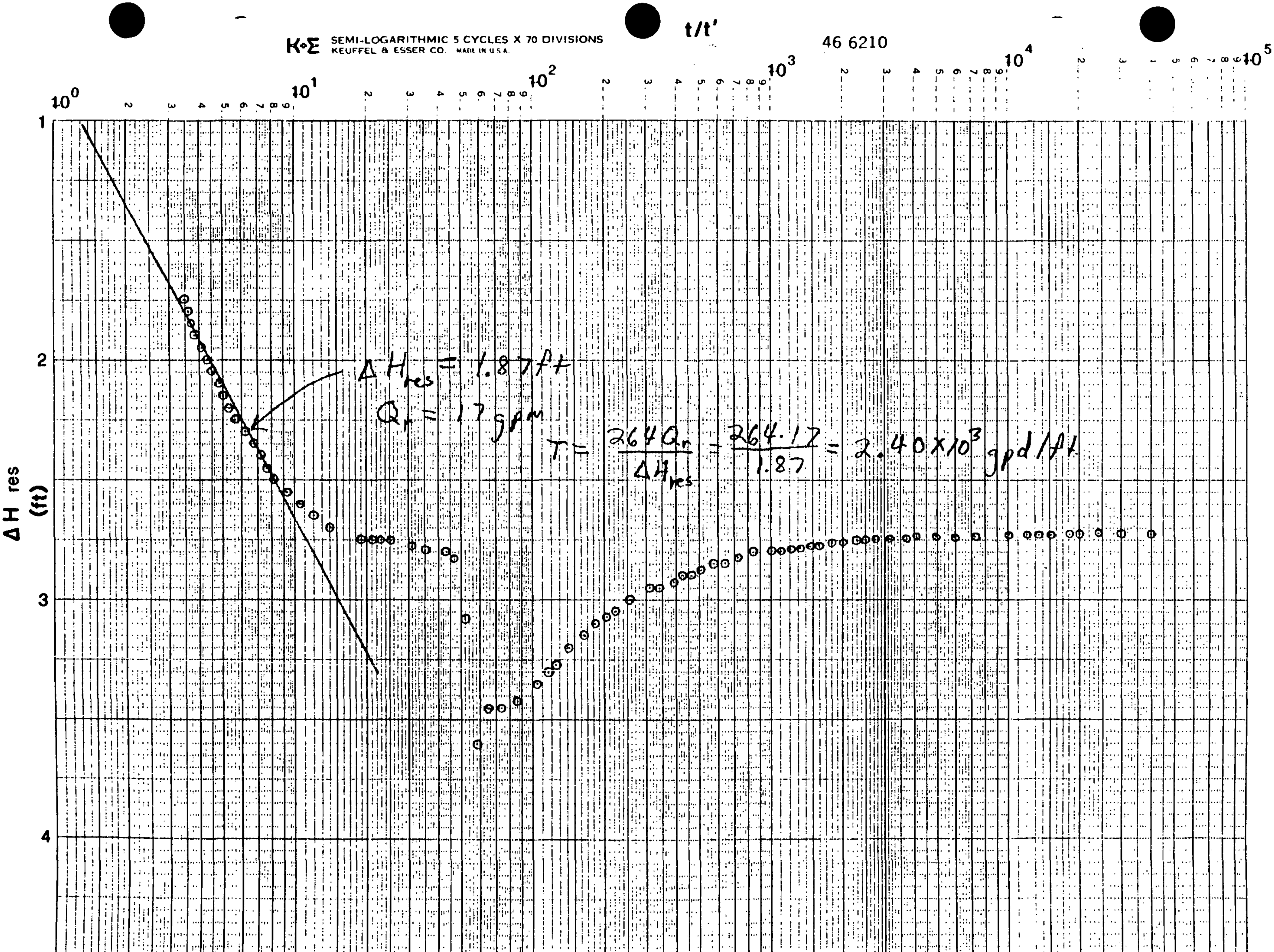
REI 10-1 RUN #2 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI-7 10/14/86

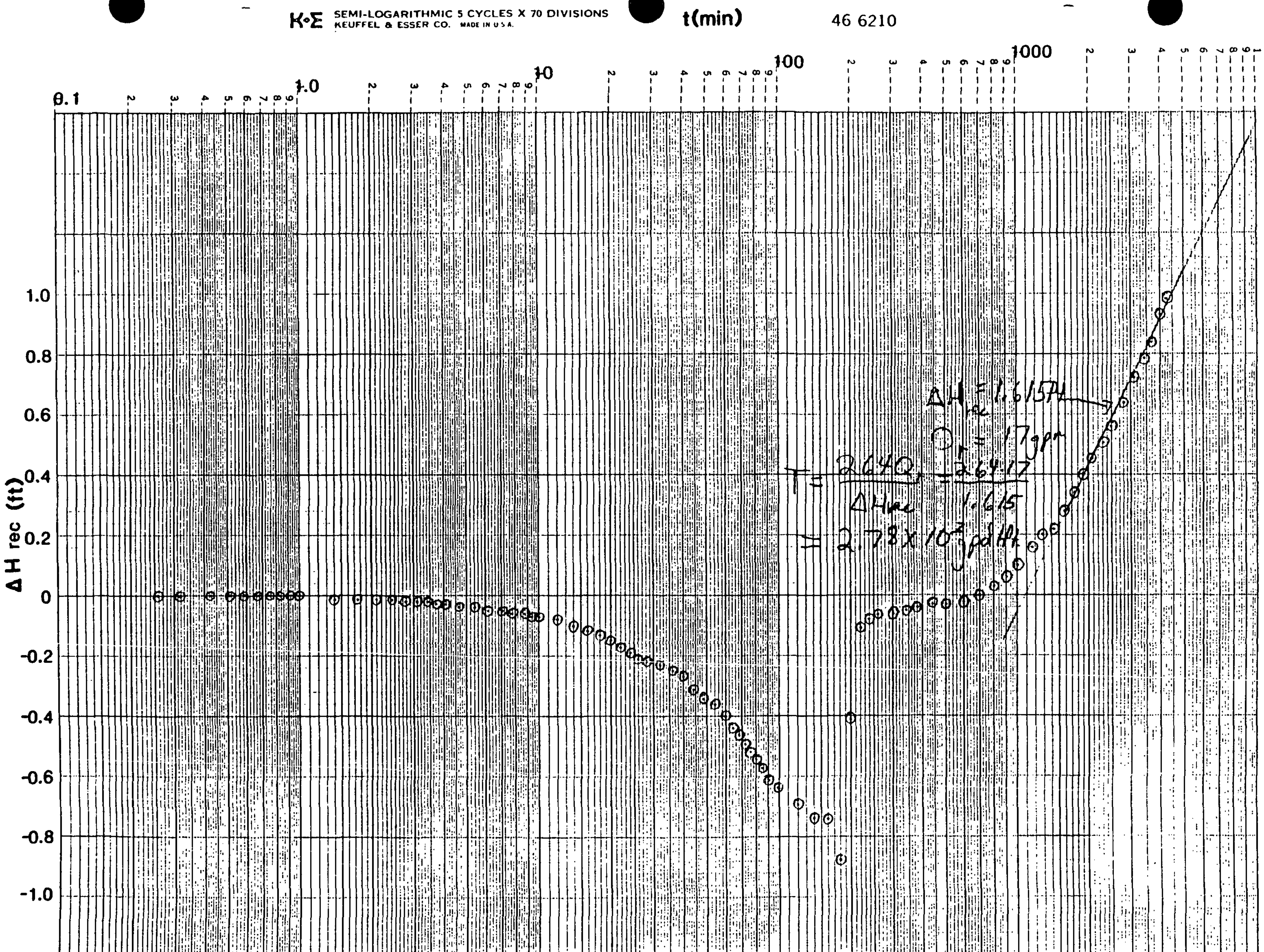




REI 10-1 RUN #2 PUMP TEST - RECOVERY

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 7 10/7/86



REI 10-1 RUN #2 PUMP TEST RECOVERY

PLOT BY D. GABRYSCH

SEMI LOG PLOT OF REI 7 10/7/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd   JOB NO.: 2?<-14

SUBJECT: REI 10-1 Run #2 Calc for REI 7   COMPUTED BY: DRG DATE: 11-14-?

CHECKED BY: DD DATE: 11-?-8?

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 1.240$ ft
$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{1.240} = \boxed{1.57 \times 10^3 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{2.26 \times 10^{-4} \text{ m}^2/\text{s}}$$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{1.57 \times 10^3 \text{ gpd/ft}}$

$b = 15.0$ ft

$$K = \frac{1.57 \times 10^3}{15.0} = \boxed{1.05 \times 10^2 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{4.95 \times 10^{-3} \text{ cm/s}}$$

Semi-Log(a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 17$ gpm
$\Delta H_{res} = 1.87$ ft

$$T = \frac{(264)(17)}{1.87} \quad \boxed{2.40 \times 10^3 \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{3.45 \times 10^{-4} \text{ m}^2/\text{s}}$$

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD JOB NO.: 273-14

SUBJECT: REI 17-1 Run #2 Calc for REI 7 COMPUTED BY: DRS DATE: 11-15-86

CHECKED BY: DD DATE: 11-17-86

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{2.40 \times 10^3 \text{ gpd/ft}}$

$b = 15.0 \text{ ft}$

$K = \frac{2.40 \times 10^3}{15.0} = \boxed{1.60 \times 10^2 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{7.54 \times 10^{-3} \text{ cm/s}}$

Semi-Log(t) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264\,Q}{\Delta H_{rec}}$

$Q = 17 \text{ gpm}$

$\Delta H_{rec} = 1.615 \text{ ft}$ $T = \frac{(264)(17)}{1.615} = \boxed{2.78 \times 10^3 \text{ gpd/ft}}$

$\times$ Conversion Factor $1.438 \times 10^{-7} = \boxed{4.00 \times 10^{-4} \text{ m}^2\text{/s}}$

ERT

K+E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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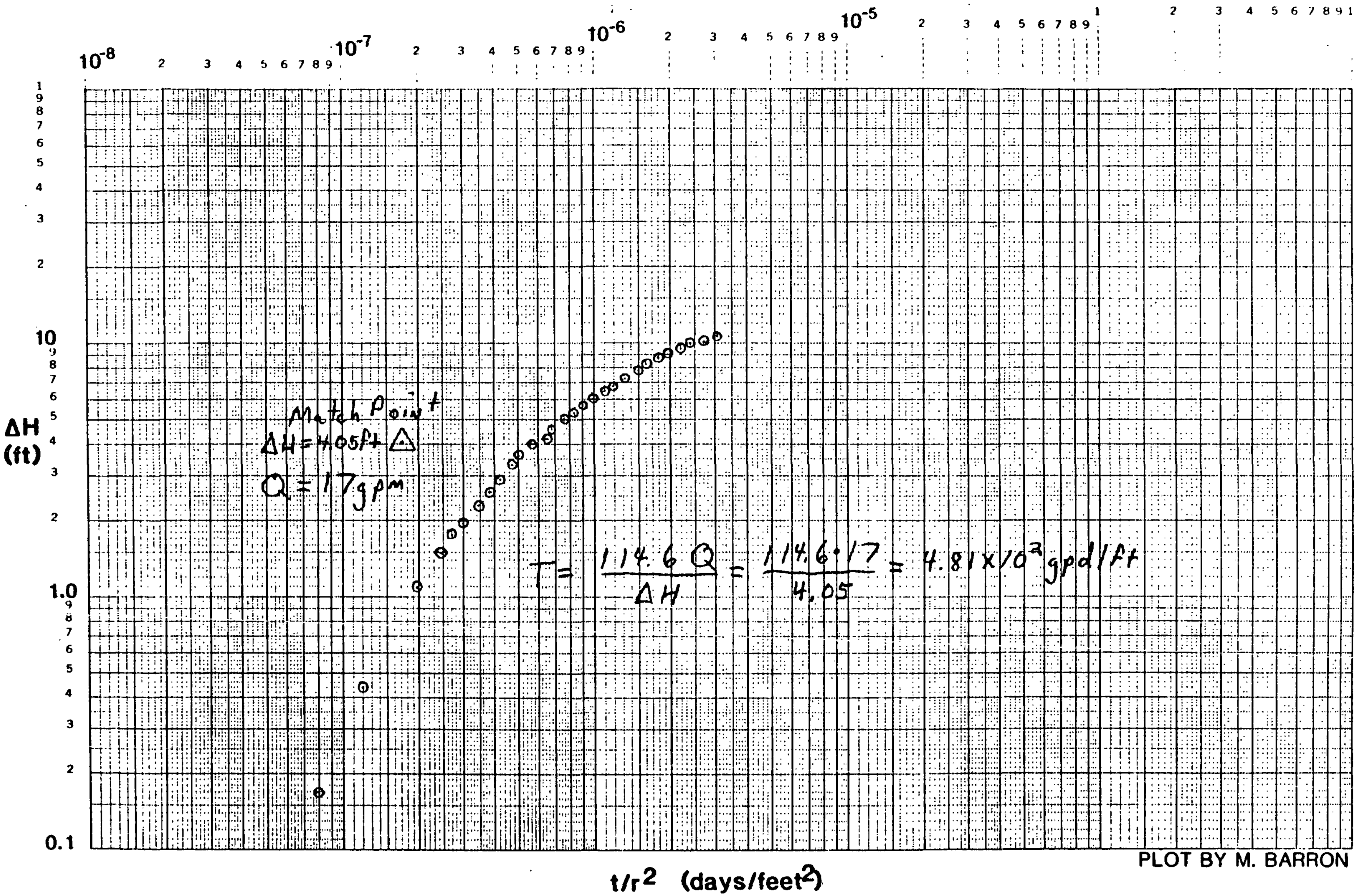
REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
LOG-LOG PLOT OF REI 12-1

10/7/86



PLOT BY M. BARRON

CALCULATIONS AND COMPUTATIONS

SHEET 6 OF ____

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 10-1 Run #2 Calc. for REI 12-1

COMPUTED BY: DRG DATE: 11/14/85

CHECKED BY: DD DATE: 11-15-85

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 4.05$ ft.
$Q = 17$ gpm

$$T = \frac{(114.6)(17)}{4.05} = \boxed{4.81 \times 10^{2} \text{ gpd/ft.}}$$

$$\text{X Conversion Factor } 1.438 \times 10^{-7} = \boxed{6.92 \times 10^{-5} \text{ m}^2/\text{s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 1.73 \times 10^{-7}$ days/ft^2

$T = \boxed{4.81 \times 10^{2} \text{ gpd/ft.}}$

$$S = \frac{(1)(4.81 \times 10^{2})(1.73 \times 10^{-7})}{1.87} = \boxed{4.45 \times 10^{-5}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

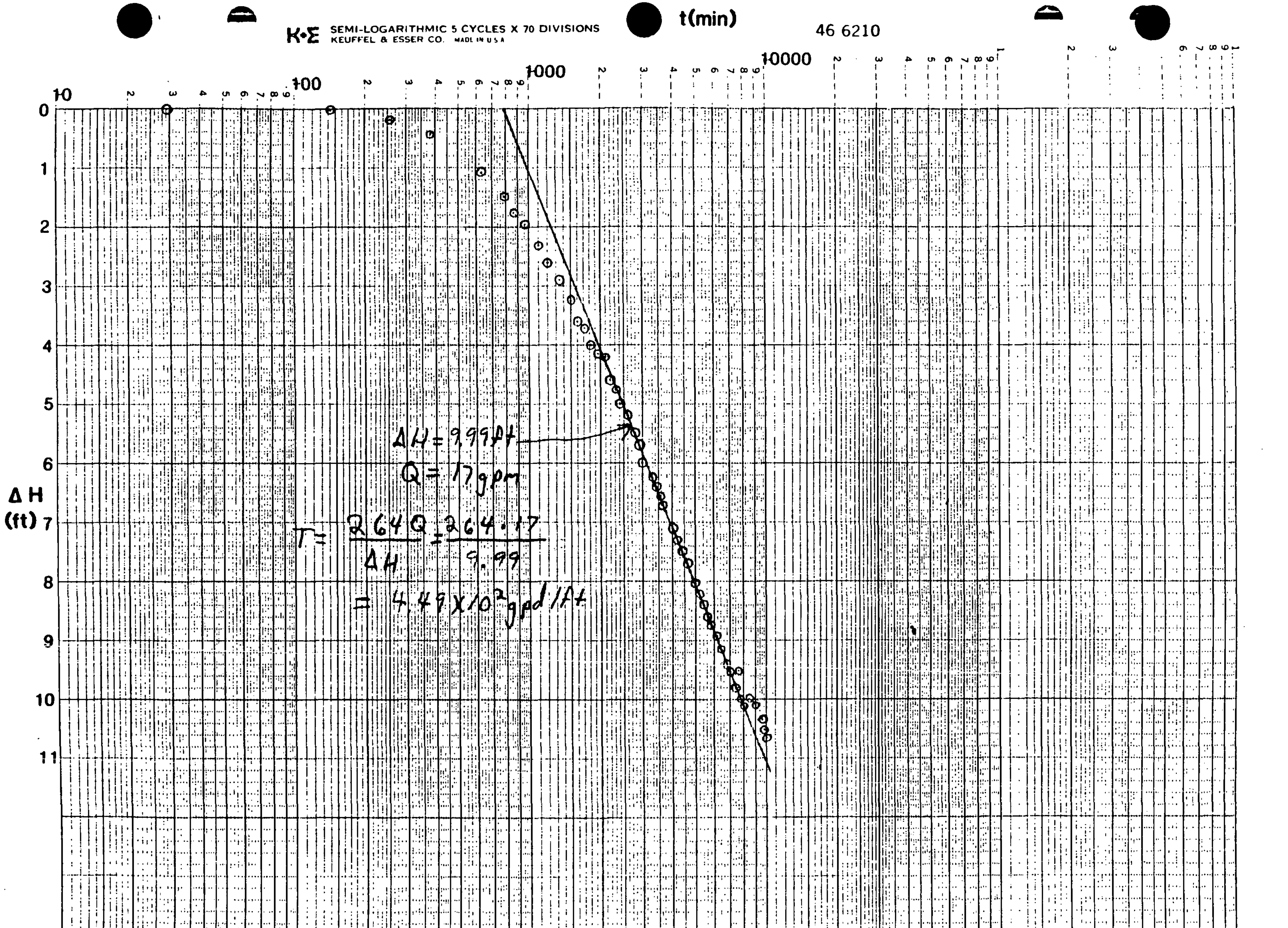
$T = \boxed{4.81 \times 10^{2} \text{ gpd/ft}}$

$b = 36.75$ ft.

$$K = \frac{4.81 \times 10^{2}}{36.75} = \boxed{1.31 \times 10^{1} \text{ gpd/ft}^2}$$

$$\text{X Conversion Factor } 4.715 \times 10^{-5} = \boxed{6.17 \times 10^{-4} \text{ cm/s}}$$

REI



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF REI 12-1 10/7/86

PLOT BY M. BARRON

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 276-14

SUBJECT: REI 10-1 Run # 2 Calc. for REI 12-1

COMPUTED BY: DRG DATE: 11-14-...

CHECKED BY: DD DATE: 11-19-86

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H}$$

$Q = 17$ gpm

$\Delta H = 9.99$ ft.

$$T = \frac{264(17)}{9.99}$$ $\boxed{4.49 \times 10^{2} \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} $\boxed{6.46 \times 10^{-5} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3\,T t_o}{r^2}$$

$r = 1492.112$ ft

$t_o = 780 \text{ min}/1440 = 5.42 \times 10^{-1}$ days

$T = \boxed{4.49 \times 10^{2} \text{ gpd/ft.}}$

$$S = \frac{(0.3)(4.49 \times 10^{2})(5.42 \times 10^{-1})}{(1492.112)^2} =$$ $\boxed{3.28 \times 10^{-5}}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

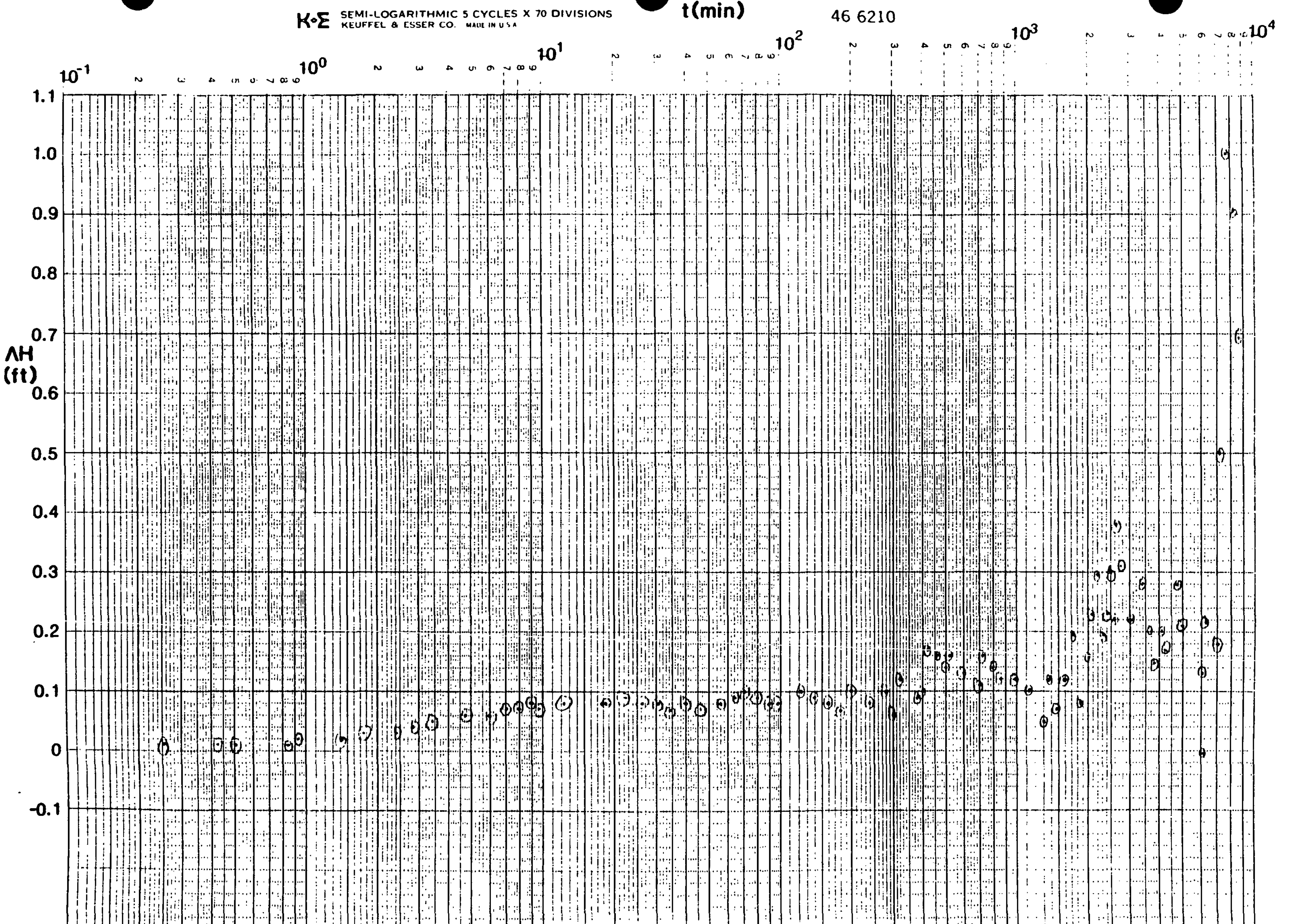
$T = \boxed{4.49 \times 10^{2} \text{ gpd/ft}}$

$b = 36.75$ ft

$$K = \frac{4.49 \times 10^{2}}{36.75} =$$ $\boxed{1.22 \times 10^{1} \text{ gpd/ft}^2}$

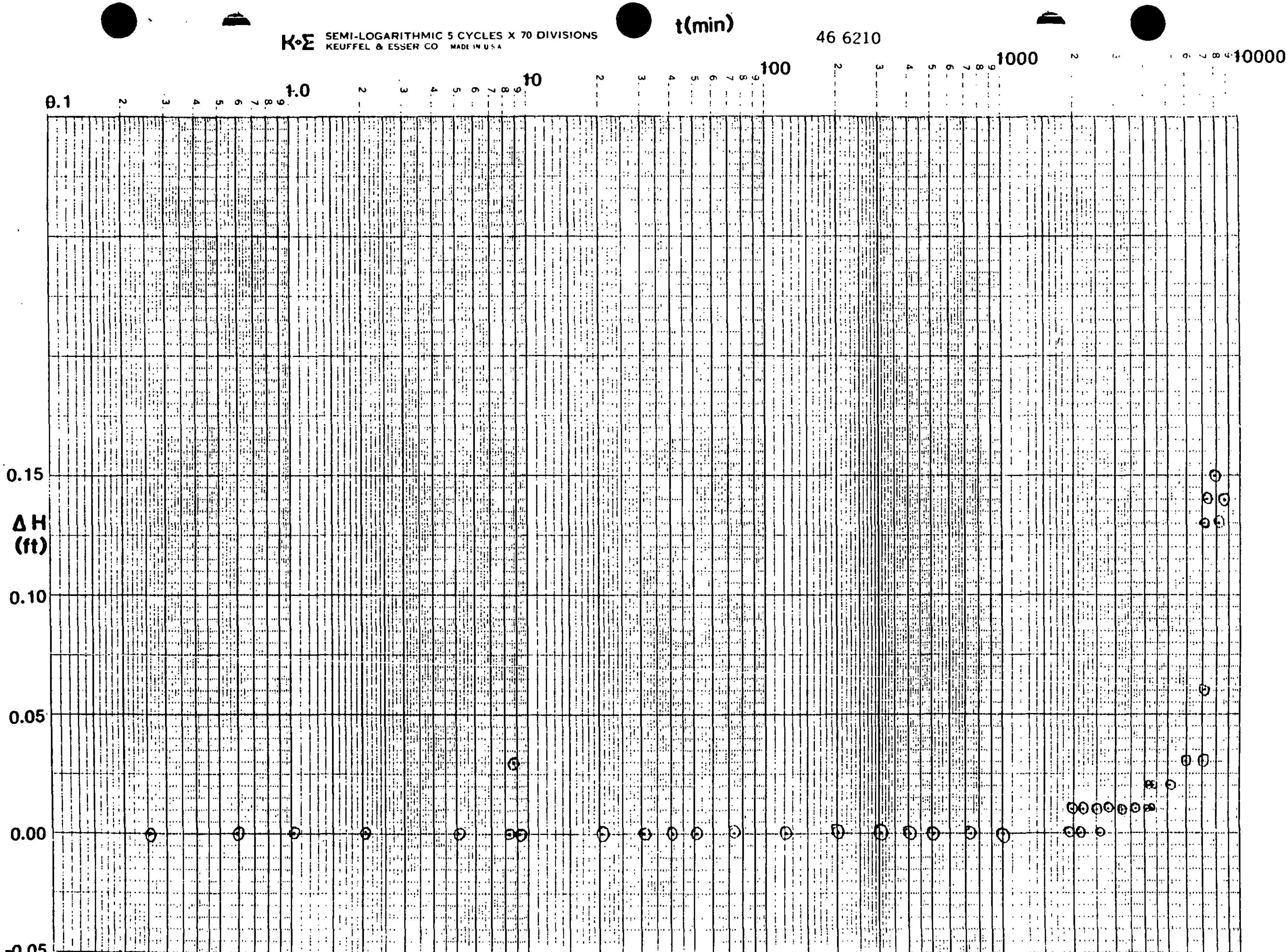
X Conversion Factor 4.715×10^{-5} = $\boxed{5.76 \times 10^{-4} \text{ cm/s}}$

REI

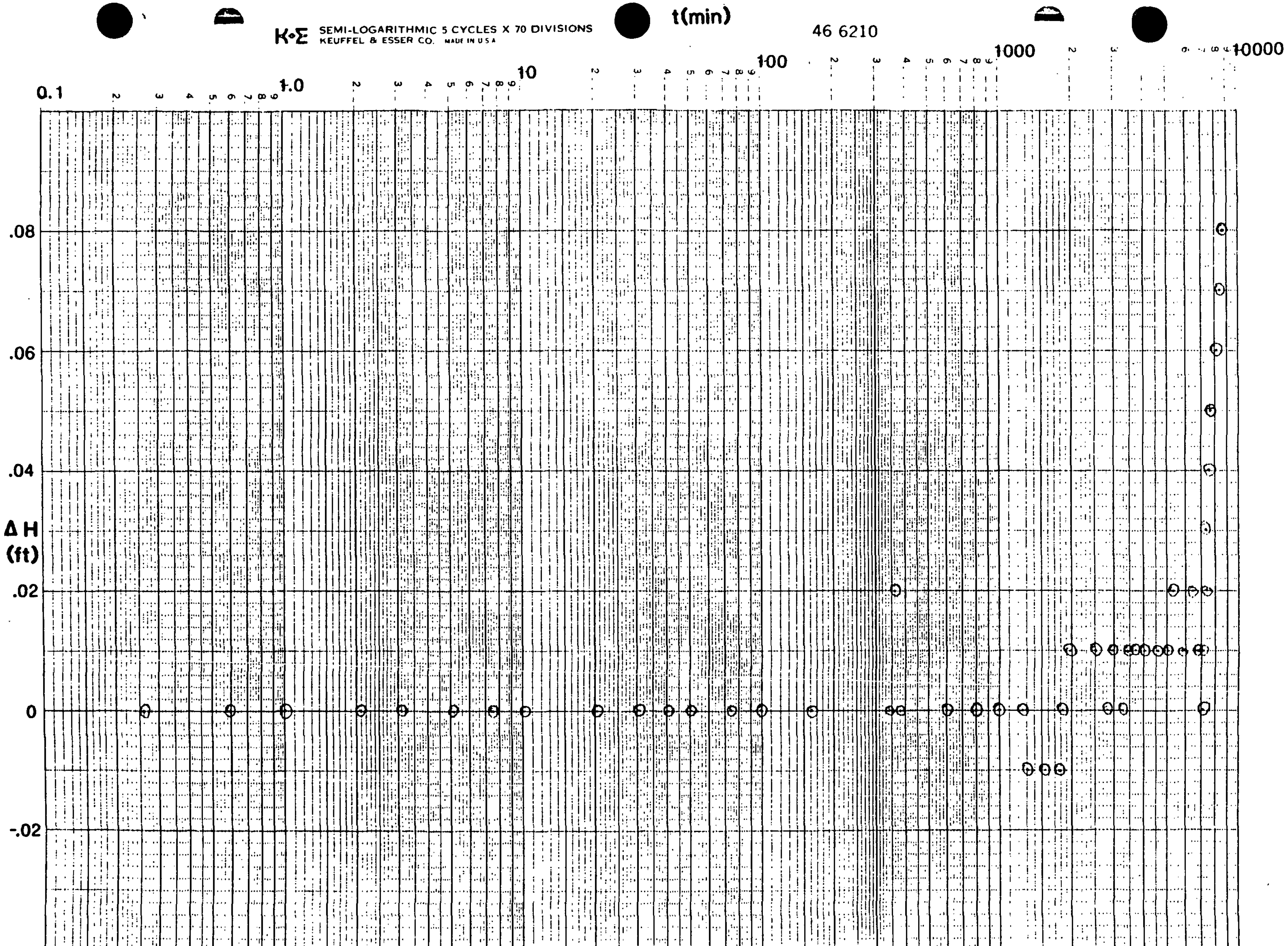


REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF P 10-2 10/7/86

PLOT BY T. BOCCA

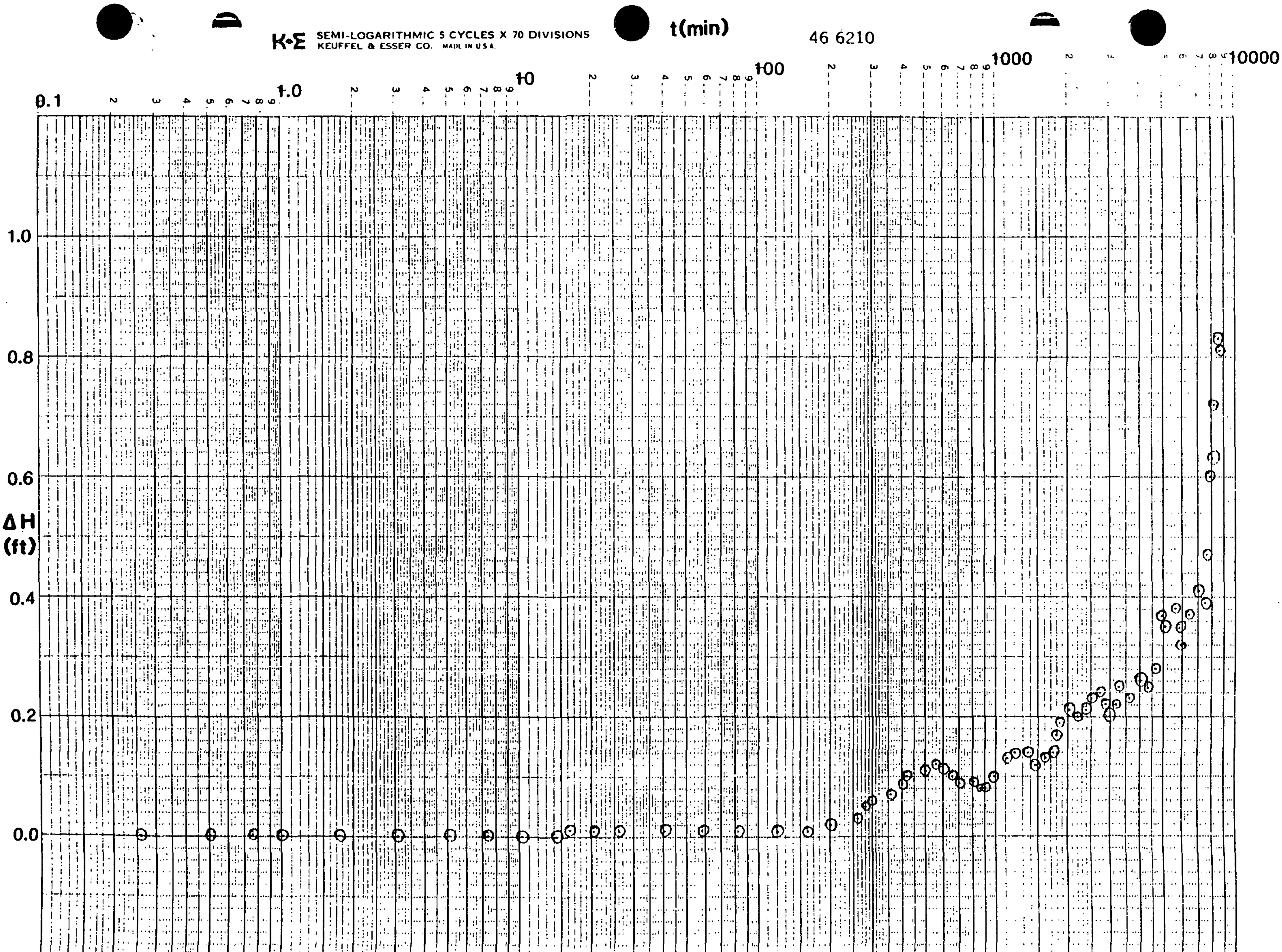


REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF P-10-3
10/7/86
PLOT BY D. GABRYSCH



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN
SEMI-LOG PLOT OF P-10-4 10/7/86

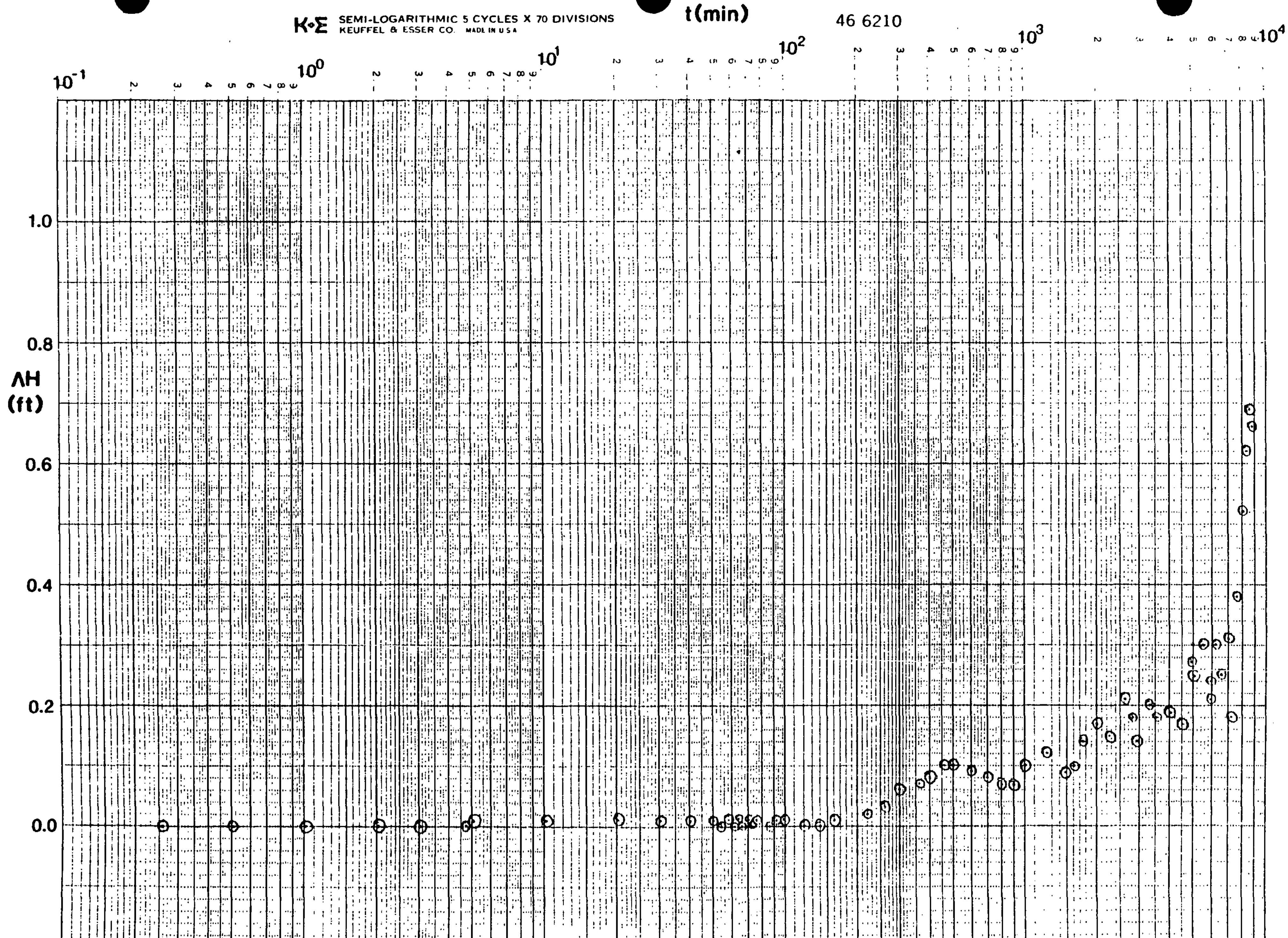
PLOT BY D. GABRYSCH



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 10-2 10/7/86

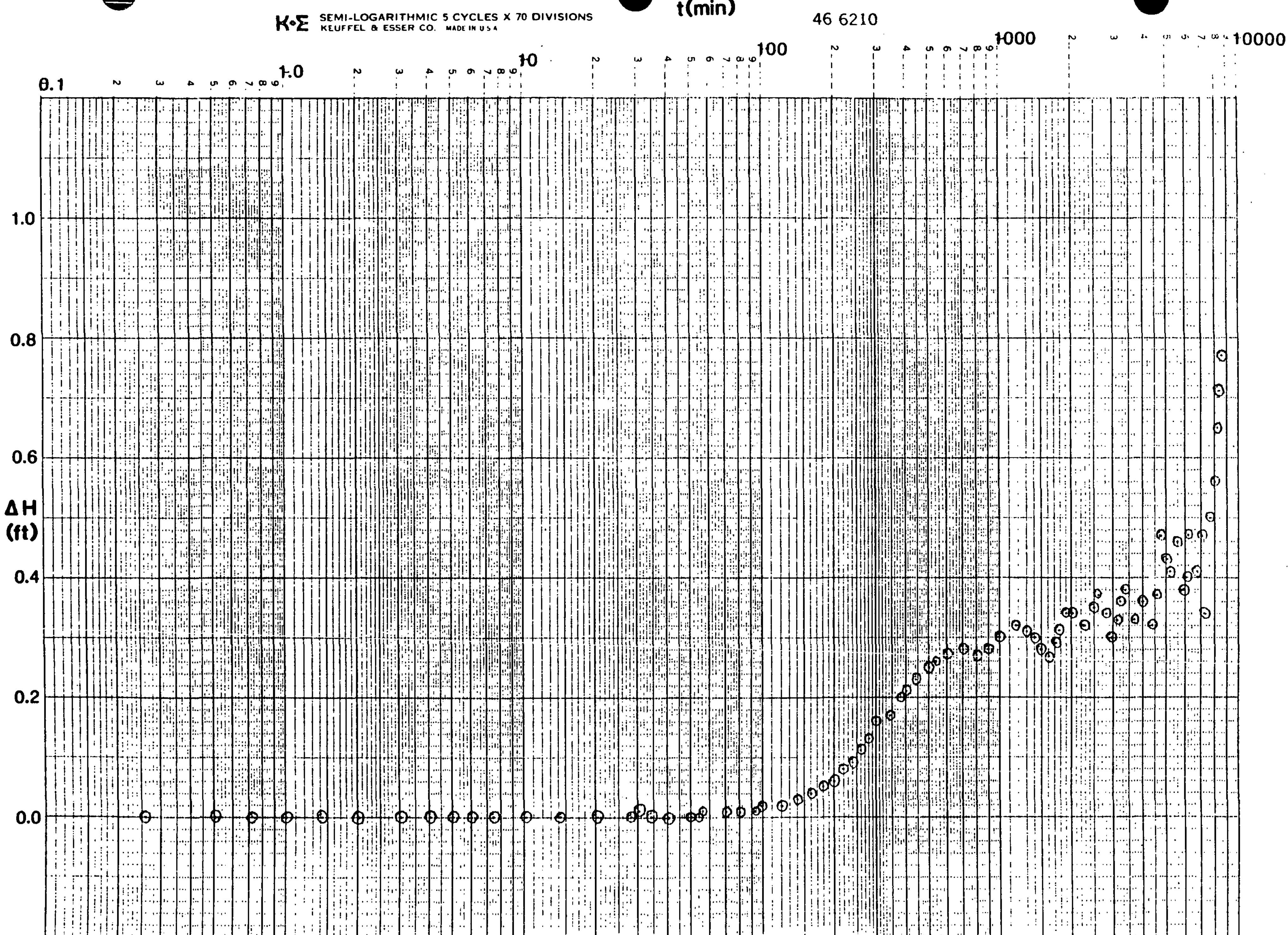
PLOT BY D. GABRYSCH



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY D. GABRYSCH

SEMI-LOG PLOT OF REI 10-2 10/7/86



REI 10-1 RUN #2 PUMP TEST - DRAWDOWN

PLOT BY D. GABRYSCH

Attachment 10

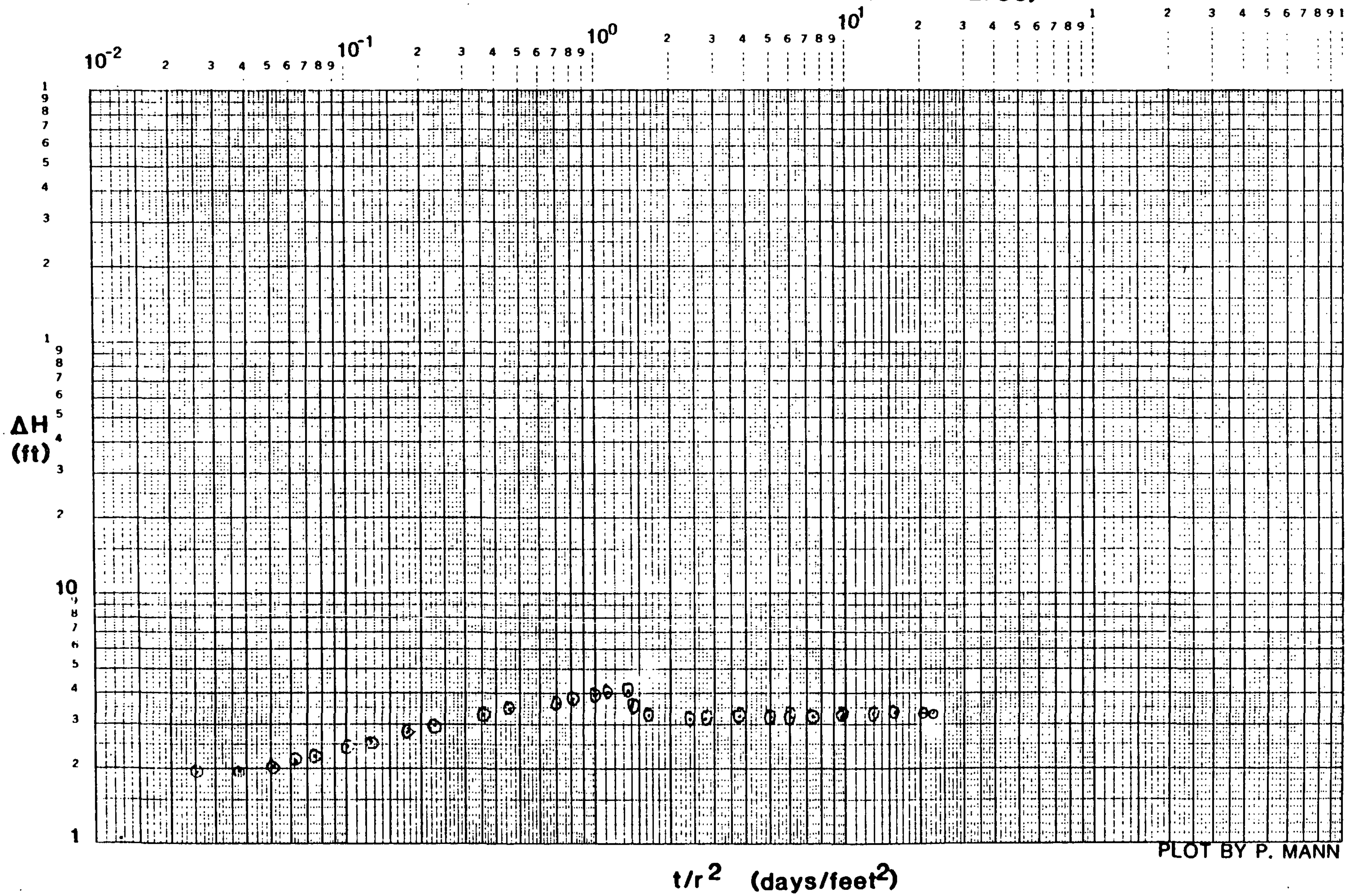
REI 3-3 Pumping Test
Response Curves and Aquifer
Characteristics Calculations

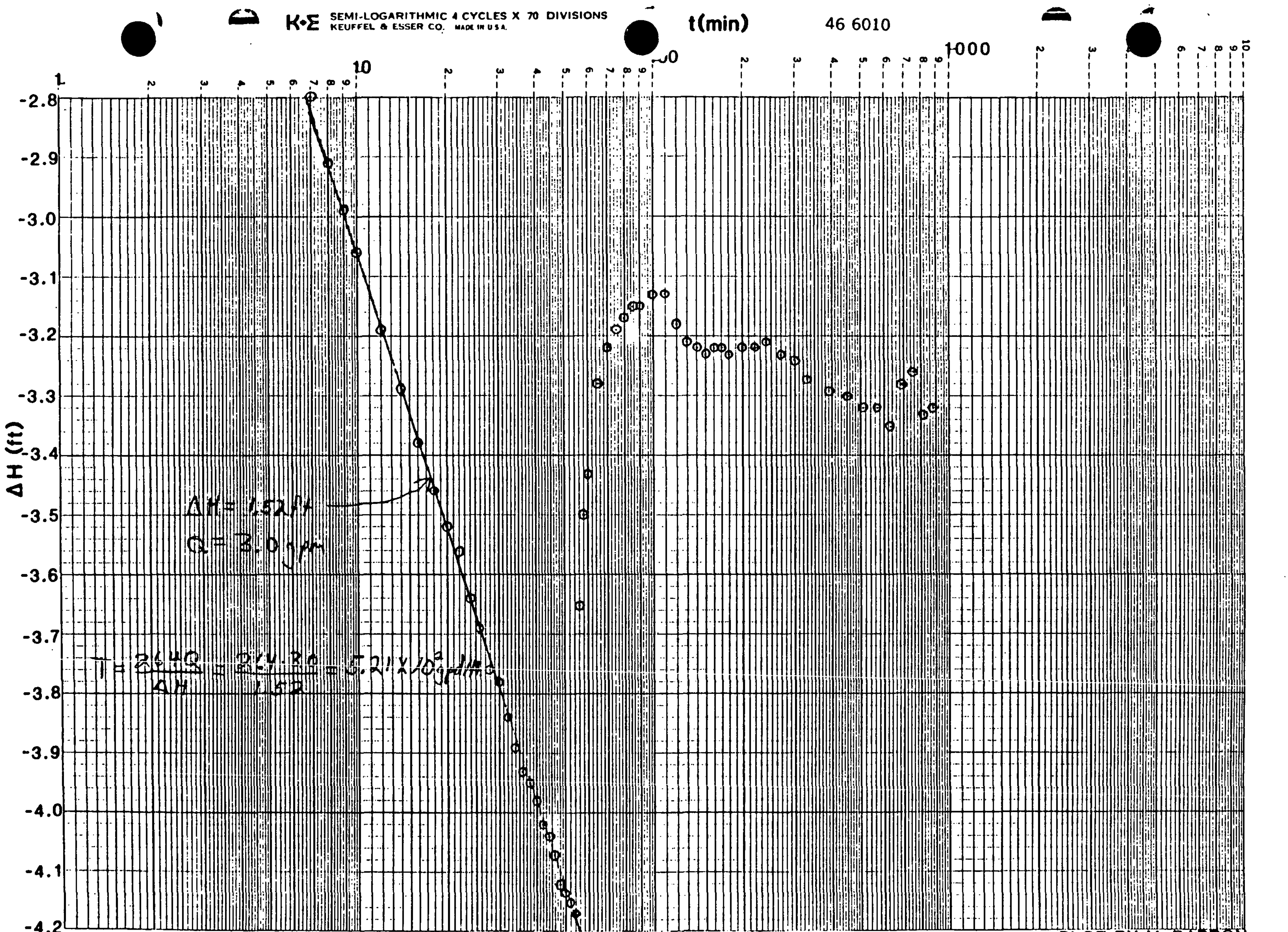
K•Σ LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 7520

REI 3-3 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-3 (8/11-12/86)





REI 3-3 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 3-3 (8/11-12/86)

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 3-3 Calc for REI 3-3

COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: ___ DATE: ___

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 3.0$ gpm

$\Delta H = 1.52$ ft $\quad T = \frac{(264)(3.0)}{1.52} = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} = $\boxed{7.49 \times 10^{-5} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3 T t_o}{r^2}$$

$r = 0.166$ ft

$t_o = 9.3 \times 10^{-1}$ min $/1440 = 6.46 \times 10^{-4}$ days

$T = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

$S = \frac{(0.3)(5.21 \times 10^2)(6.46 \times 10^{-4})}{(0.166)^2} = \boxed{3.66 \times 10^0}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

$b = 14.0$ ft

$K = \frac{5.21 \times 10^2}{14.0} = \boxed{3.72 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} = $\boxed{1.75 \times 10^{-3} \text{ cm/s}}$

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K+E LOGARITHMIC 3 x 5 CYCLES
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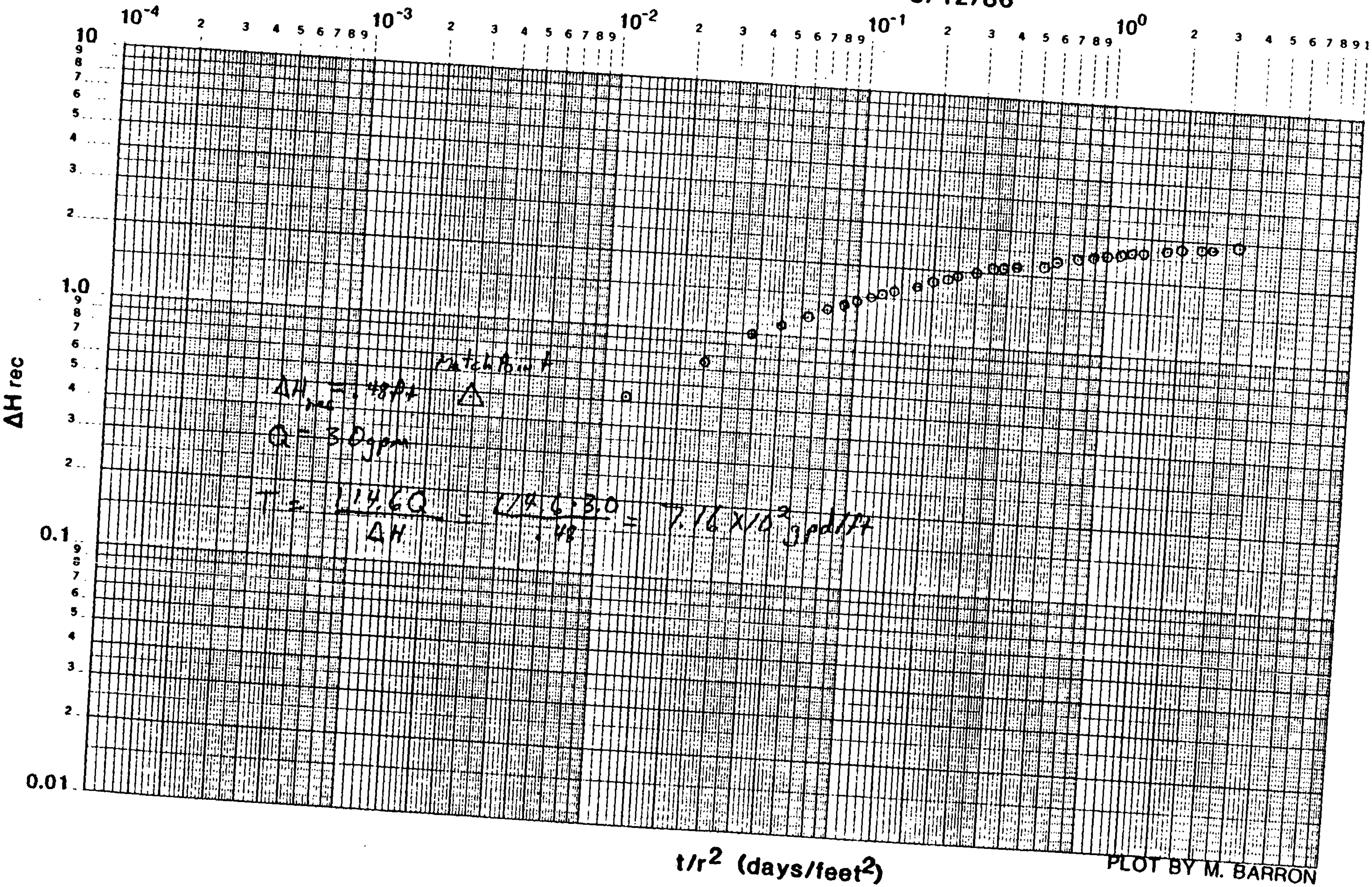
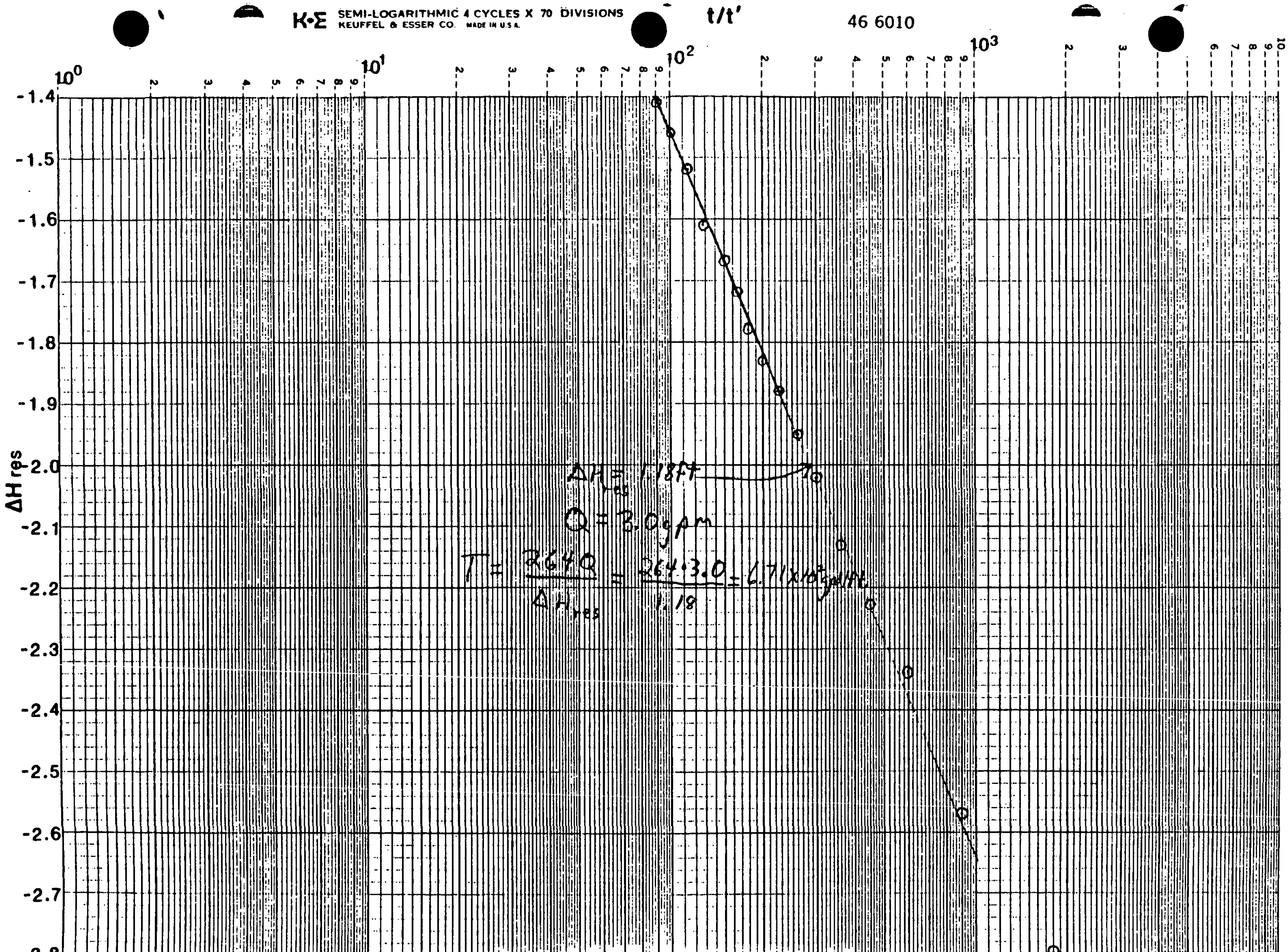
REI 3-3 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI 3-3 8/12/86



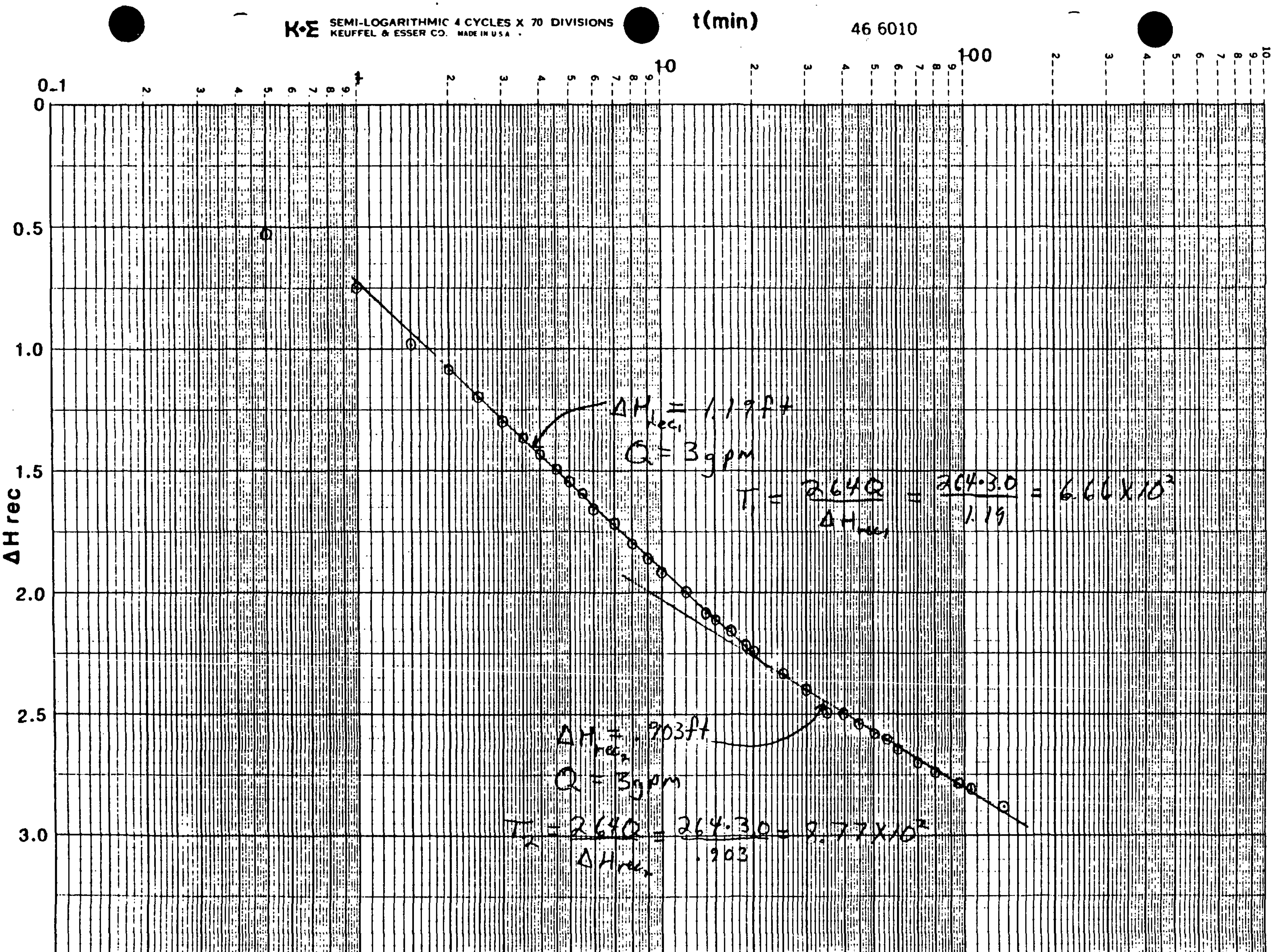
PLOT BY M. BARRON



REI 3-3 PUMP TEST - RECOVERY

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 3-3 8/12/86



REI 3-3 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF REI 3-3 8/11/86

PLOT BY D. GABRYSCH

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd.   JOB NO.: [illegible]-14

SUBJECT: REI 3-3 Calc for REI 3-3   COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: ______ DATE: ______

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 3.0$ gpm

$\Delta H = 0.48$ ft $T = \frac{(114.6)(3.0)}{0.48}$ = $\boxed{7.16 \times 10^{2} \text{ gpd/ft}}$

$\times$ Conversion Factor 1.438×10^{-7} = $\boxed{1.03 \times 10^{-4} \text{ m}^2/\text{s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{7.16 \times 10^{2} \text{ gpd/ft}}$

$b = 14.0$ ft

$K = \frac{7.16 \times 10^{2}}{14.0}$ = $\boxed{5.12 \times 10^{1} \text{ gpd/ft}^2}$

$\times$ Conversion Factor 4.715×10^{-5} = $\boxed{2.41 \times 10^{-3} \text{ cm/s}}$

Semi-Log (a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 3.0$ gpm

$\Delta H_{res} = 1.18$ ft $T = \frac{(264)(3.0)}{1.18}$ = $\boxed{6.71 \times 10^{2} \text{ gpd/ft}}$

$\times$ Conversion Factor 1.438×10^{-7} = $\boxed{9.65 \times 10^{-5} \text{ m}^2/\text{s}}$

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CALCULATIONS AND COMPUTATIONS

SHEET___ OF___

PROJECT: FRENCH LTD

JOB NO.: 27?-14

SUBJECT: REI 3-3 Calc for REI 3-3

COMPUTED BY: DRG DATE: 11/2?

CHECKED BY: ___ DATE: ___

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{6.71 \times 10^2 \text{ gpd/ft}}$

$b = 14.0$ ft

$K = \frac{6.71 \times 10^2}{14.0} = \boxed{4.79 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor 4.715×10^{-5} $= \boxed{2.26 \times 10^{-3} \text{ cm/s}}$

Semi-Log (t) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264\,Q}{\Delta H_{rec}}$

$Q = 3.0$ gpm

$\Delta H_{rec_1} = 1.19$ ft $\quad T_1 = \frac{(264)(3.0)}{1.19} = \boxed{6.66 \times 10^2 \text{ gpd/ft}}$

$\Delta H_{rec_2} = 0.903$ ft $\quad T_2 = \frac{(264)(3.0)}{0.903} = \boxed{8.77 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor 1.438×10^{-7} $= \boxed{9.57 \times 10^{-5} \text{ m}^2\text{/s}}$

$\boxed{1.26 \times 10^{-4} \text{ m}^2\text{/s}}$

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K+E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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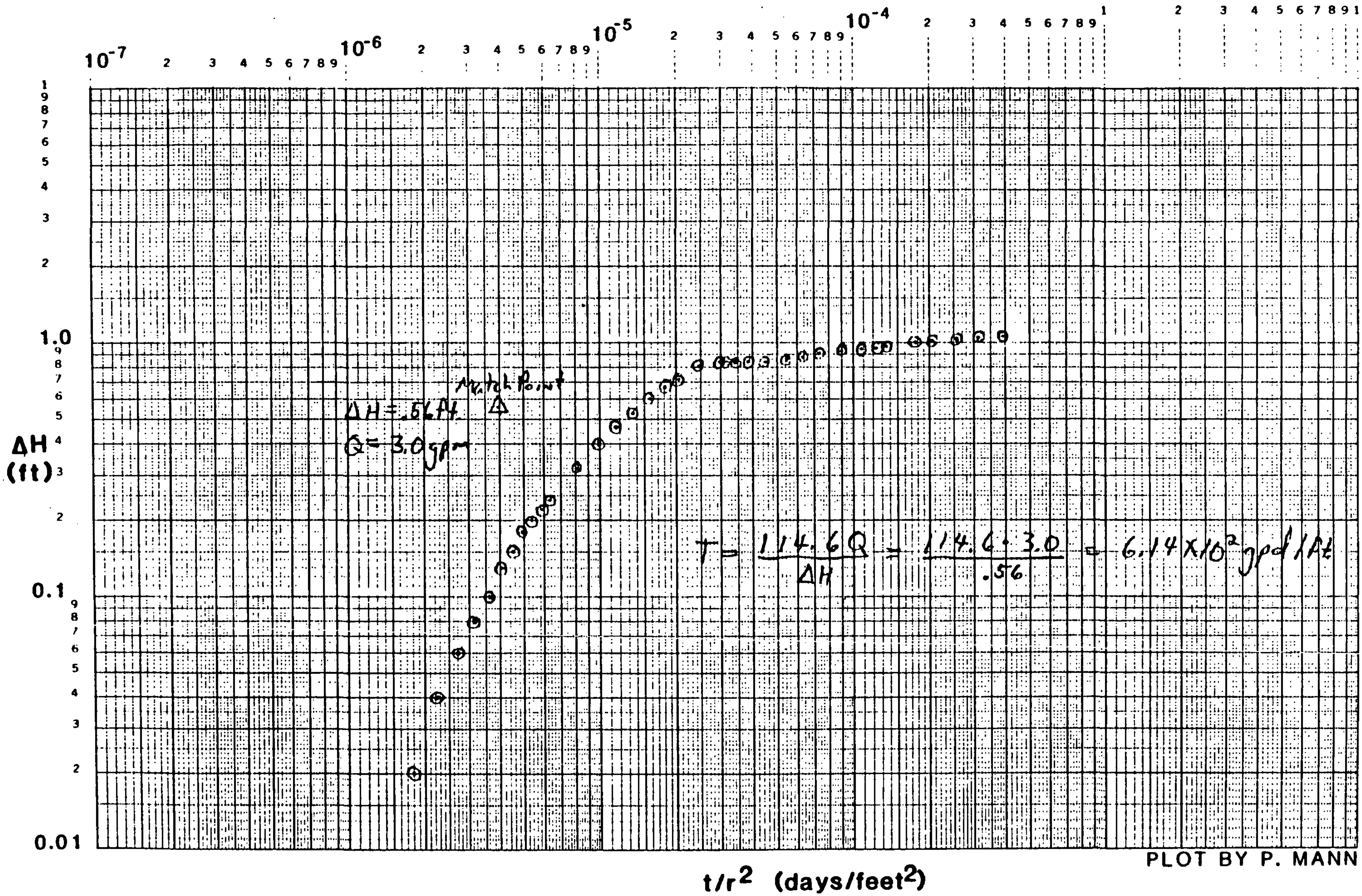
REI 3-3 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-5 (8/11 -12/86)



CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: FRENCH LTD JOB NO.: 27<-14

SUBJECT: REI 3-3 Calc. for REI 3-5 COMPUTED BY: DRG DATE: 11/9/

CHECKED BY: ______ DATE: ______

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 0.56$ ft $T = \frac{(114.6)(3.0)}{0.56}$ = $\boxed{6.14 \times 10^{2} \text{ gpd/ft}}$

$Q = 3.0$ gpm

$\times$ Conversion Factor 1.438×10^{-7} = $\boxed{8.83 \times 10^{-5} \text{ m}^2\text{/s}}$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 3.95 \times 10^{-6}$ days/ft^2

$T = \boxed{6.14 \times 10^{2} \text{ gpd/ft}}$

$S = \frac{(1)(6.14 \times 10^{2})(3.95 \times 10^{-6})}{1.87}$ = $\boxed{1.30 \times 10^{-3}}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{6.14 \times 10^{2} \text{ gpd/ft}}$

$b = 15.20$ ft

$K = \frac{6.14 \times 10^{2}}{15.20}$ = $\boxed{4.04 \times 10^{1} \text{ gpd/ft}^2}$

$\times$ Conversion Factor 4.715×10^{-5} = $\boxed{1.90 \times 10^{-3} \text{ cm/s}}$

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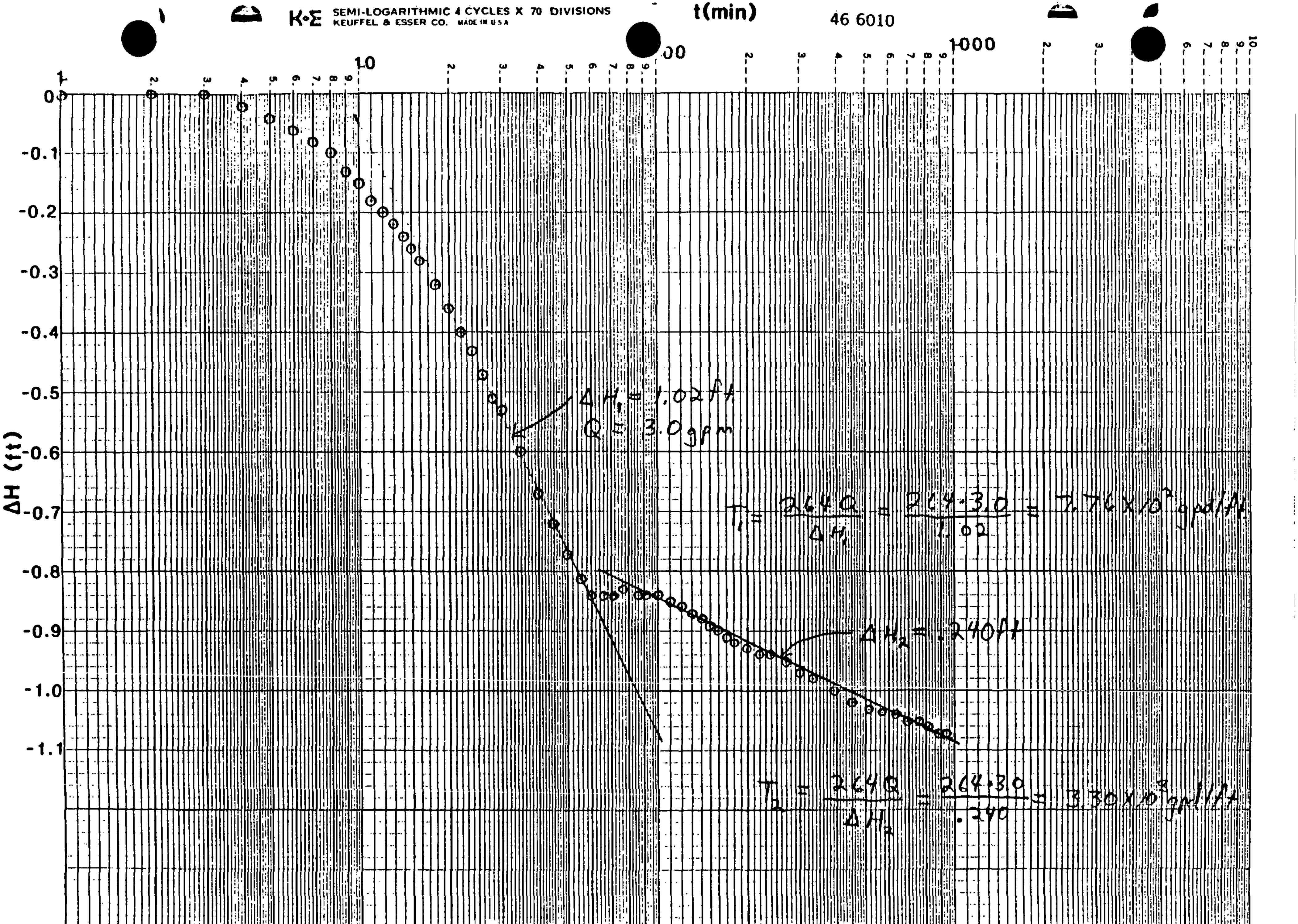

REI 3-3 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 3-5 (8/11 -12/86)

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 27?-14

SUBJECT: REI 3-2 Calc for REI 3-5

COMPUTED BY: DPC DATE: ____

CHECKED BY: ____ DATE: ____

Semi-Log solution for Transmissivity - Drawdown

Transmissivity $(T) = \frac{264Q}{\Delta H}$

$Q = 3.0$ gpm

$\Delta H_1 = 1.02$ ft $\quad T_1 = \frac{(264)(3.0)}{1.02} = \boxed{7.76 \times 10^2 \text{ gpd/ft}}$

$\Delta H_2 = 2.40$ ft $\quad T_2 = \frac{(264)(3.0)}{.240} = \boxed{3.30 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor 1.432×10^{-7} = $\boxed{1.12 \times 10^{-4} \text{ m}^2\text{/s}}$ $\boxed{4.73 \times 10^{-4} \text{ m}^2\text{/s}}$

Semi-Log solution for Storativity - Drawdown

Storativity $(S) = \frac{0.3 T t_0}{r^2}$

$r = 39.33$ ft

$t_{o_1} = 89 \text{ min}/1440 = 6.18 \times 10^{-2}$ days

$T_1 = \boxed{7.76 \times 10^2 \text{ gpd/ft}}$

$t_{o_2} = 3.4 \times 10^{-2} \text{ min}/1440 = 2.36 \times 10^{-5}$ days

$T_2 = \boxed{3.30 \times 10^3 \text{ gpd/ft}}$

$S_1 = \frac{(0.3)(7.76 \times 10^2)(6.18 \times 10^{-2})}{(39.33)^2}$ $\boxed{9.31 \times 10^{-3}}$

$S_2 = \frac{(0.3)(3.30 \times 10^3)(2.36 \times 10^{-5})}{(39.33)^2}$ $\boxed{1.51 \times 10^{-5}}$

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CALCULATIONS AND COMPUTATIONS

SHEET____ OF____

PROJECT: FRENCH LTD JOB NO.: 275-14

SUBJECT: EFI 3-3 Calc for REI 3-5

COMPUTED BY: DRG DATE:

CHECKED BY:____ DATE:____

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ - where b is the screened thickness in feet.

$T_1 = \boxed{7.76 \times 10^2 \text{ gpd/ft}}$

$b = 15.20 \text{ ft}$

$K_1 = \frac{7.76 \times 10^2}{15.20} = \boxed{5.11 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{2.41 \times 10^{-3} \text{ cm/s}}$

$T_2 = \boxed{3.30 \times 10^2 \text{ gpd/ft}}$

$b = 15.20 \text{ ft}$

$K = \frac{3.30 \times 10^2}{15.20} = \boxed{2.17 \times 10^1 \text{ gpd/ft}^2}$

$\times$ Conversion Factor $4.715 \times 10^{-5} = \boxed{1.02 \times 10^{-3} \text{ cm/s}}$

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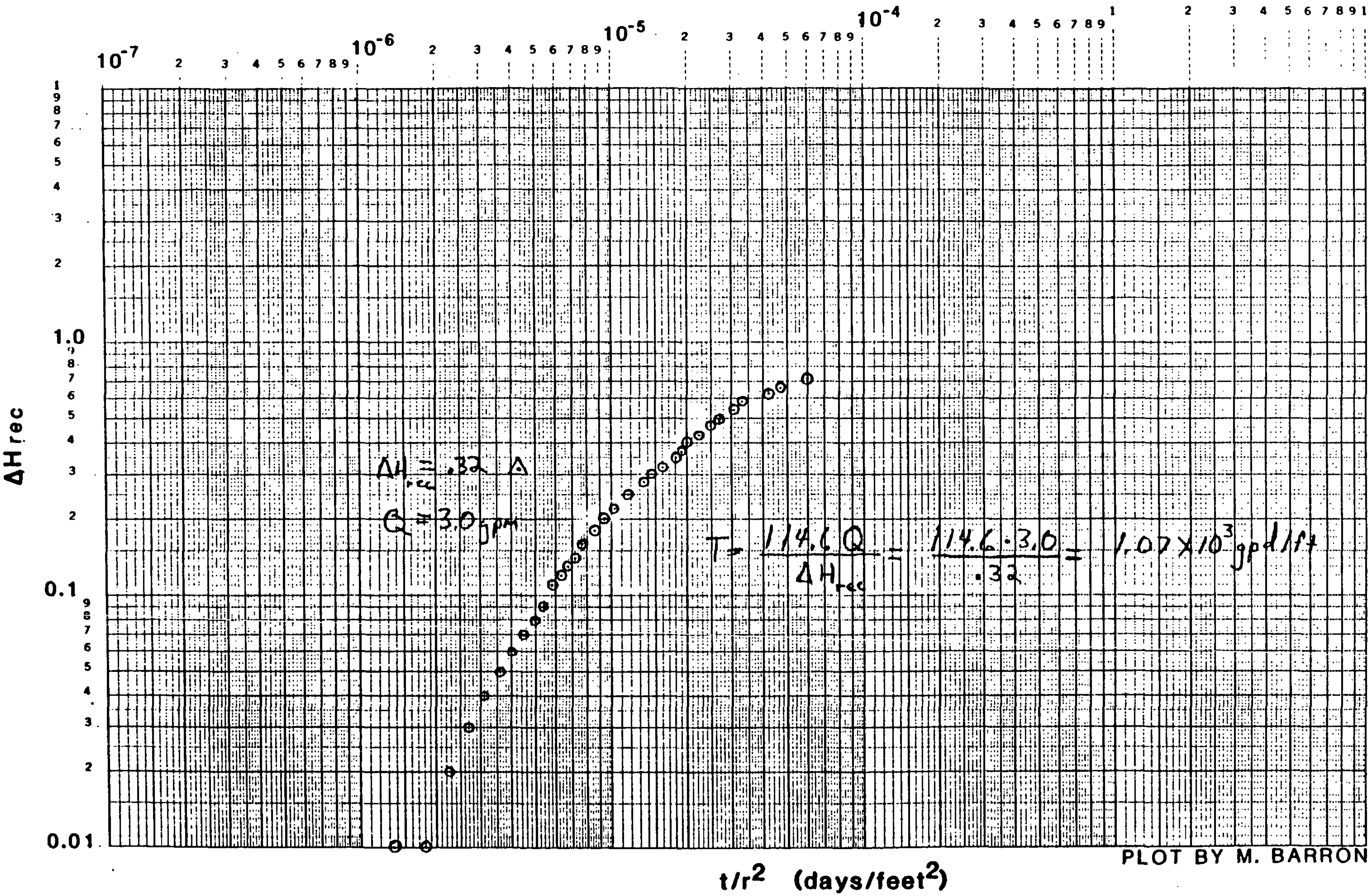
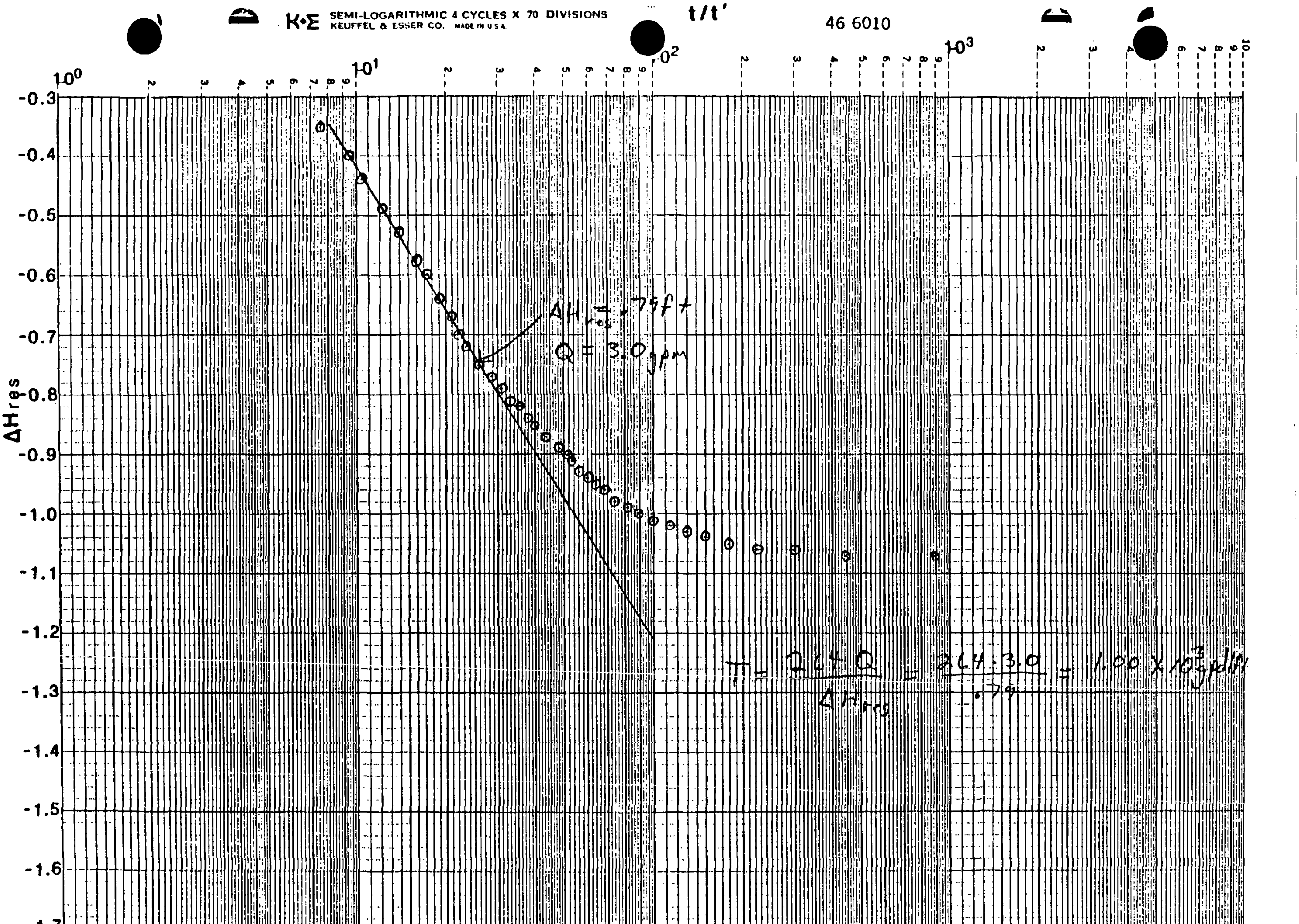
REI 3-3 PUMP TEST - RECOVERY

LOG-LOG PLOT OF REI 3-5 8/12/86

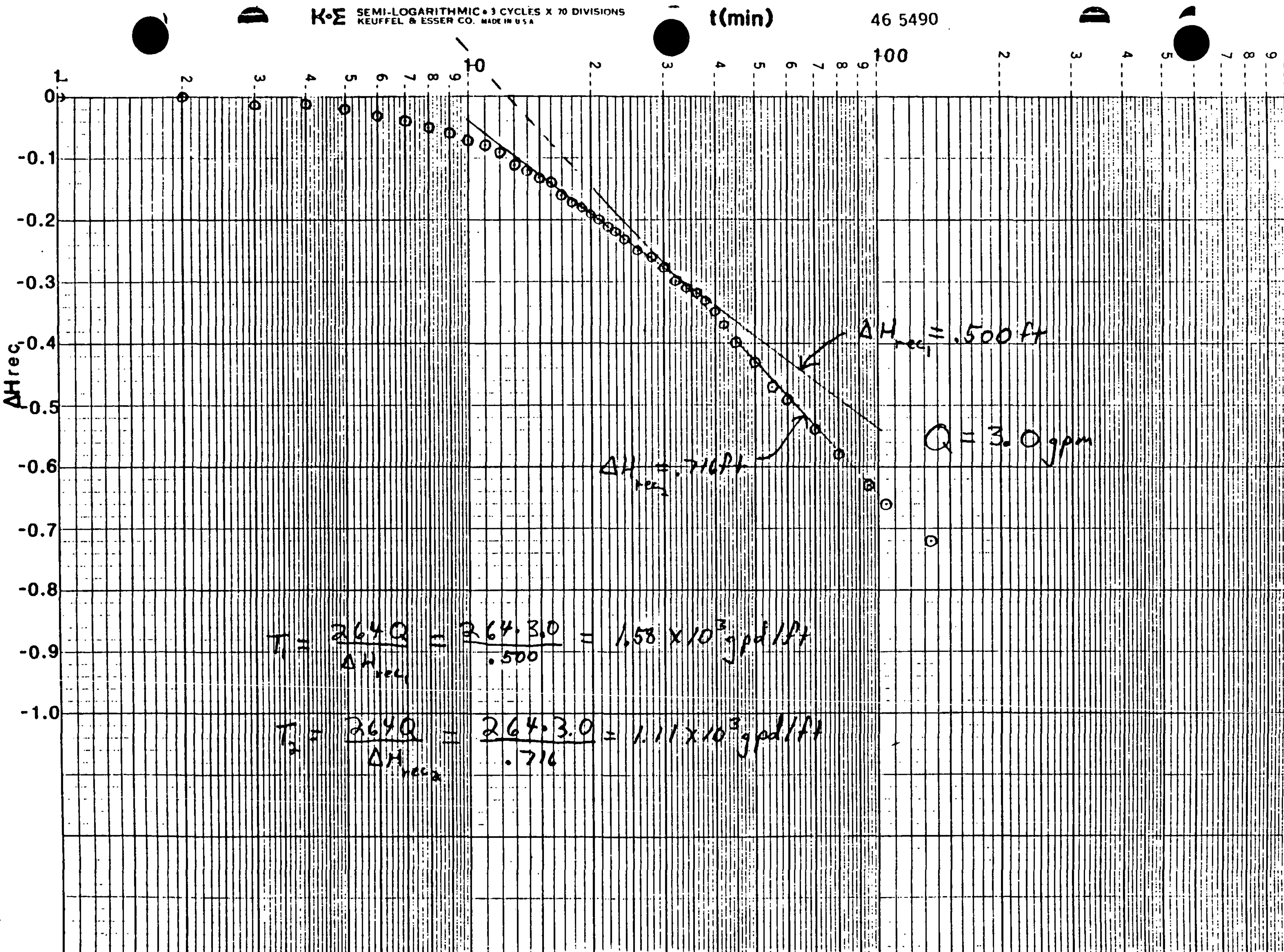




REI 3-3 PUMP TEST - RECOVERY

PLOT BY M. BARRON

SEMI-LOG PLOT OF REI 3-5 8/12/86



PLOT BY M. BARRON

REI 3-3 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF REI 3-5 8/12/86

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd

JOB NO.: [illegible]

SUBJECT: RFI 3-2 Calc for RFI 3-6

COMPUTED BY: [illegible] DATE: [illegible]

CHECKED BY: ___ DATE: ___

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\,Q\,W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 3.0$ gpm

$\Delta H = 0.32$ ft $\quad T = \frac{(114.6)(3.0)}{0.32} = \boxed{1.07 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor $1.438 \times 10^{-7} = \boxed{1.54 \times 10^{-4} \text{ m}^2/\text{s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{1.07 \times 10^3 \text{ gpd/ft}}$

$b = 15.20$ ft

$K = \frac{1.07 \times 10^3}{15.20} = \boxed{7.07 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{3.33 \times 10^{-3} \text{ cm/s}}$

Semi-Log(a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{res}}$$

$Q = 3.0$ gpm

$\Delta H_{res} = 0.79$ ft $\quad T = \frac{(264)(3.0)}{0.79} = \boxed{1.00 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor $1.438 \times 10^{-7} = \boxed{1.44 \times 10^{-4} \text{ m}^2/\text{s}}$

ERT

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: FRENCH LTD JOB NO.: [illegible]

SUBJECT: REI 3-2 Calc for REI 3-5 COMPUTED BY: DRG DATE: [illegible]

CHECKED BY: ______ DATE: ______

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{1.00 \times 10^3 \text{ gpd/ft}}$

$b = 15.20$ ft

$K = \frac{1.00 \times 10^3}{15.20} = \boxed{6.60 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{3.11 \times 10^{-3} \text{ cm/s}}$

Semi-Log (t) solution for Transmissivity - Recovery

Transmissivity $(T) = \frac{264\,Q}{\Delta H_{rec}}$

$Q = 3.0$ gpm

$\Delta H_{rec\,1} = 0.500$ ft $T_1 = \frac{(264)(3.0)}{0.500} = \boxed{1.58 \times 10^3 \text{ gpd/ft}}$

$\Delta H_{rec\,2} = 0.716$ ft $T_2 = \frac{(264)(3.0)}{0.716} = \boxed{1.11 \times 10^3 \text{ gpd/ft}}$

X Conversion Factor $1.432 \times 10^{-7} = \boxed{2.25 \times 10^{-4} \text{ m}^2\text{/s}}$ $\boxed{1.59 \times 10^{-4} \text{ m}^2\text{/s}}$

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K•E LOGARITHMIC 3 x 5 CYCLES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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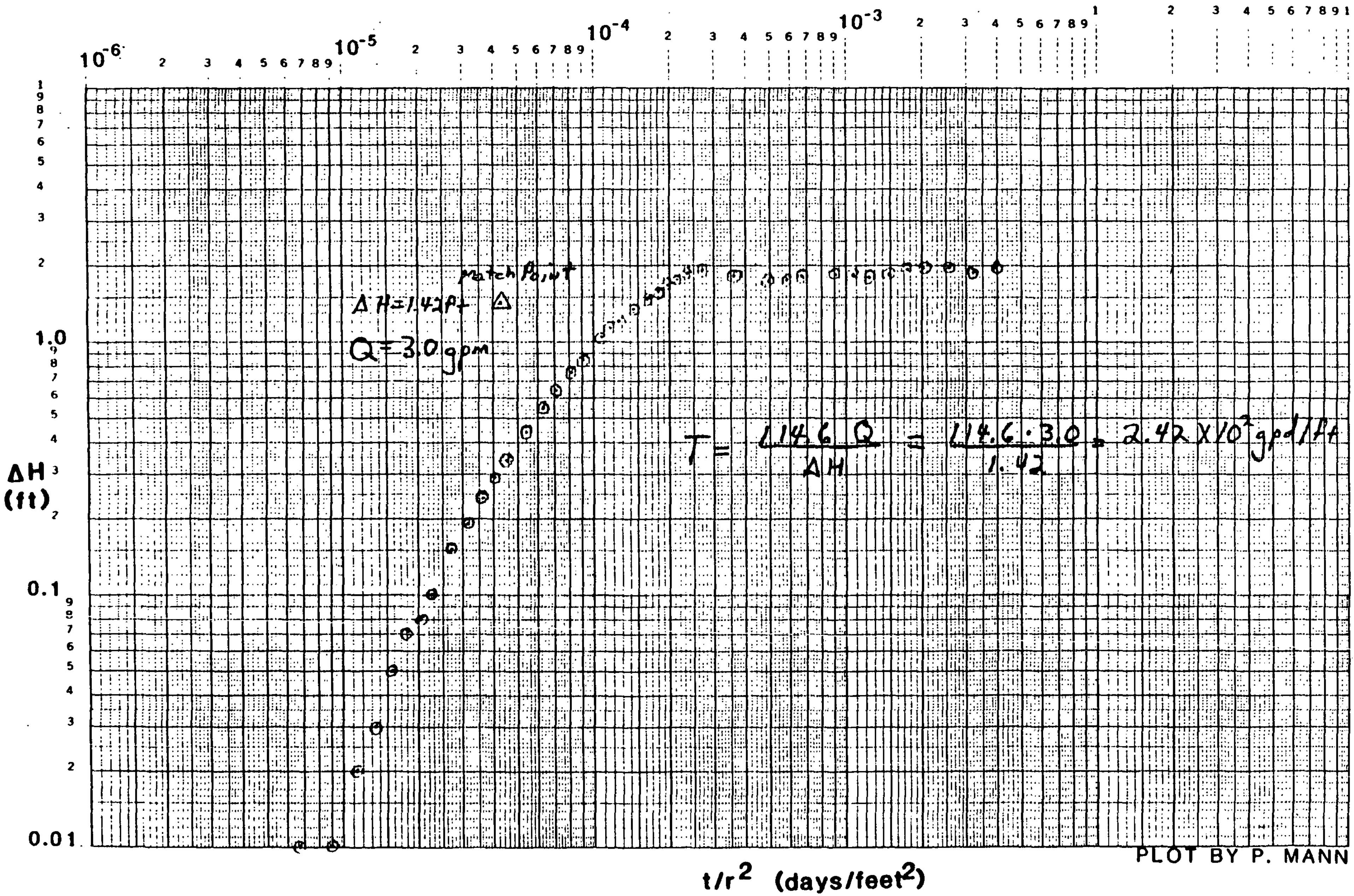
REI 3-3 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF P3-3 (8/11 -12/86)



CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 3-3 Calc. for P3-3

COMPUTED BY: LRS DATE: 11/6/8[illegible]

CHECKED BY: ______ DATE: ______

Log-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$\Delta H = 1.42$ ft

$Q = 3.0$ gpm

$$T = \frac{(114.6)(3.0)}{1.42} = \boxed{2.42 \times 10^{2} \text{ gpd/ft}}$$

$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{3.48 \times 10^{-5} \text{ m}^2\text{/s}}$$

Log-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{uT}{1.87}\left(\frac{t}{r^2}\right)$$

where $u = 1$

$t/r^2 = 4.3 \times 10^{-5}$ days/ft^2

$T = \boxed{2.42 \times 10^{2} \text{ gpd/ft}}$

$$S = \frac{(1)(2.42 \times 10^{2})(4.3 \times 10^{-5})}{1.87} = \boxed{5.57 \times 10^{-3}}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{2.42 \times 10^{2} \text{ gpd/ft}}$

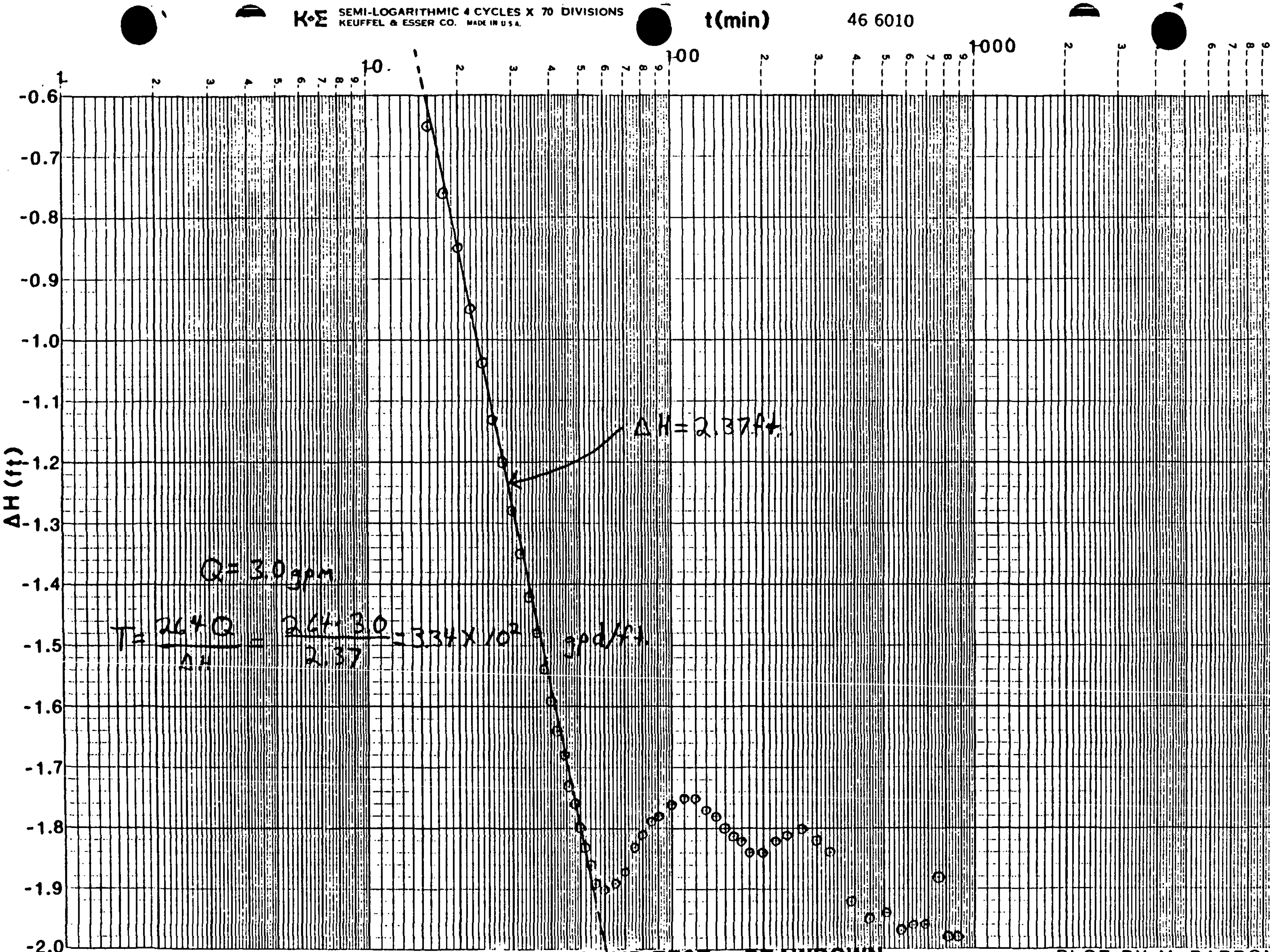
$b = 14.0$ ft (?)*

$$K = \frac{2.42 \times 10^{2}}{14.0} = \boxed{1.73 \times 10^{1} \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.716 \times 10^{-5} = \boxed{8.15 \times 10^{-4} \text{ cm/s}}$$

* No boring log available. Thickness of screen for P3-3 based on boring log of REI 3-3.

ERT



REI 3-3 PUMP TEST - DRAWDOWN

PLOT BY M. BARRON

SEMI-LOG PLOT OF P3-3 (8/11 -12/86)

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 275-14

SUBJECT: REI 3-3 Calc for P3-3

COMPUTED BY: DRG DATE: 11-20-

CHECKED BY: ___ DATE: ___

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 3.0$ gpm

$\Delta H = 2.37$ ft $\quad T = \frac{(264)(3.0)}{2.37} = \boxed{3.34 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor $1.438 \times 10^{-7} = \boxed{4.81 \times 10^{-5} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3 T t_0}{r^2}$$

$r = 12.42$ ft

$t_0 = 9.0 \text{ min}/1440 = 6.25 \times 10^{-3}$ days

$T = \boxed{3.34 \times 10^2 \text{ gpd/ft}}$

$S = \frac{(0.3)(3.34 \times 10^2)(6.25 \times 10^{-3})}{(12.42)^2} = \boxed{4.06 \times 10^{-3}}$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{3.34 \times 10^2 \text{ gpd/ft}}$

$b = 14.0$ ft (?) *

$K = \frac{3.34 \times 10^2}{14.0} = \boxed{2.39 \times 10^1 \text{ gpd/ft}^2}$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{1.13 \times 10^{-3} \text{ cm/s}}$

* No boring log available. Thickness of screen for P3-3 based on boring log of REI 3-3.

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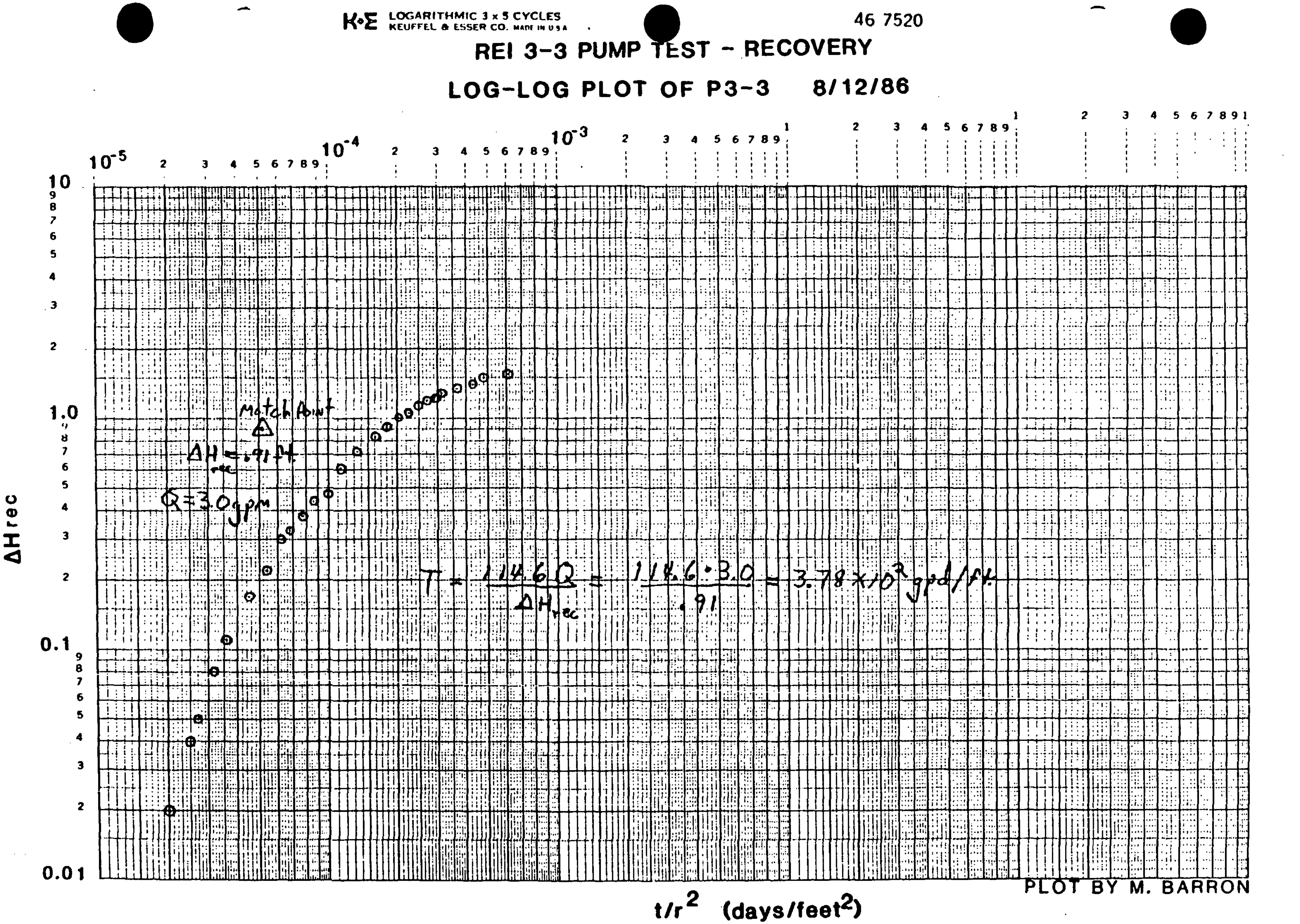
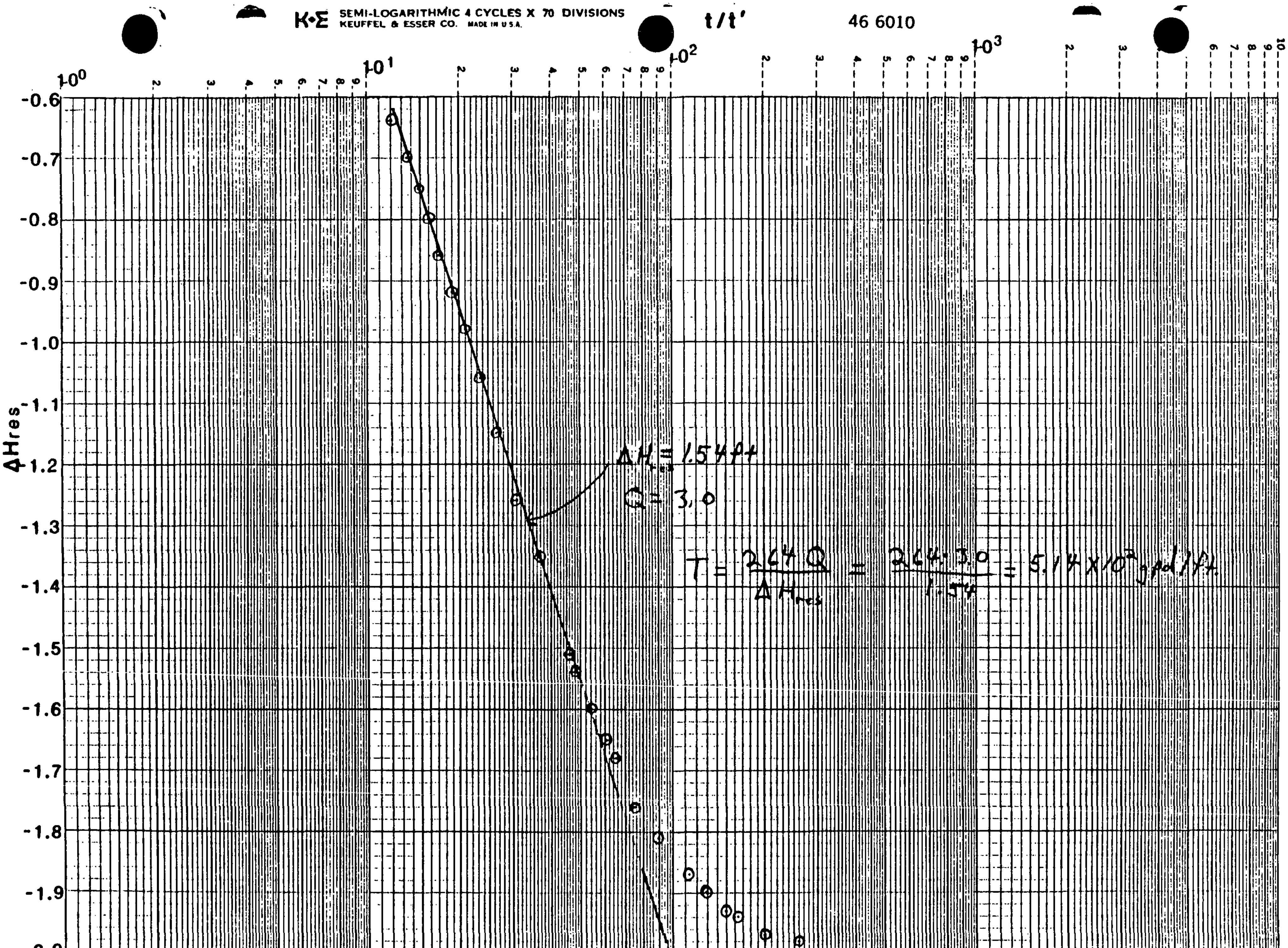
REI 3-3 PUMP TEST - RECOVERY

LOG-LOG PLOT OF P3-3 8/12/86

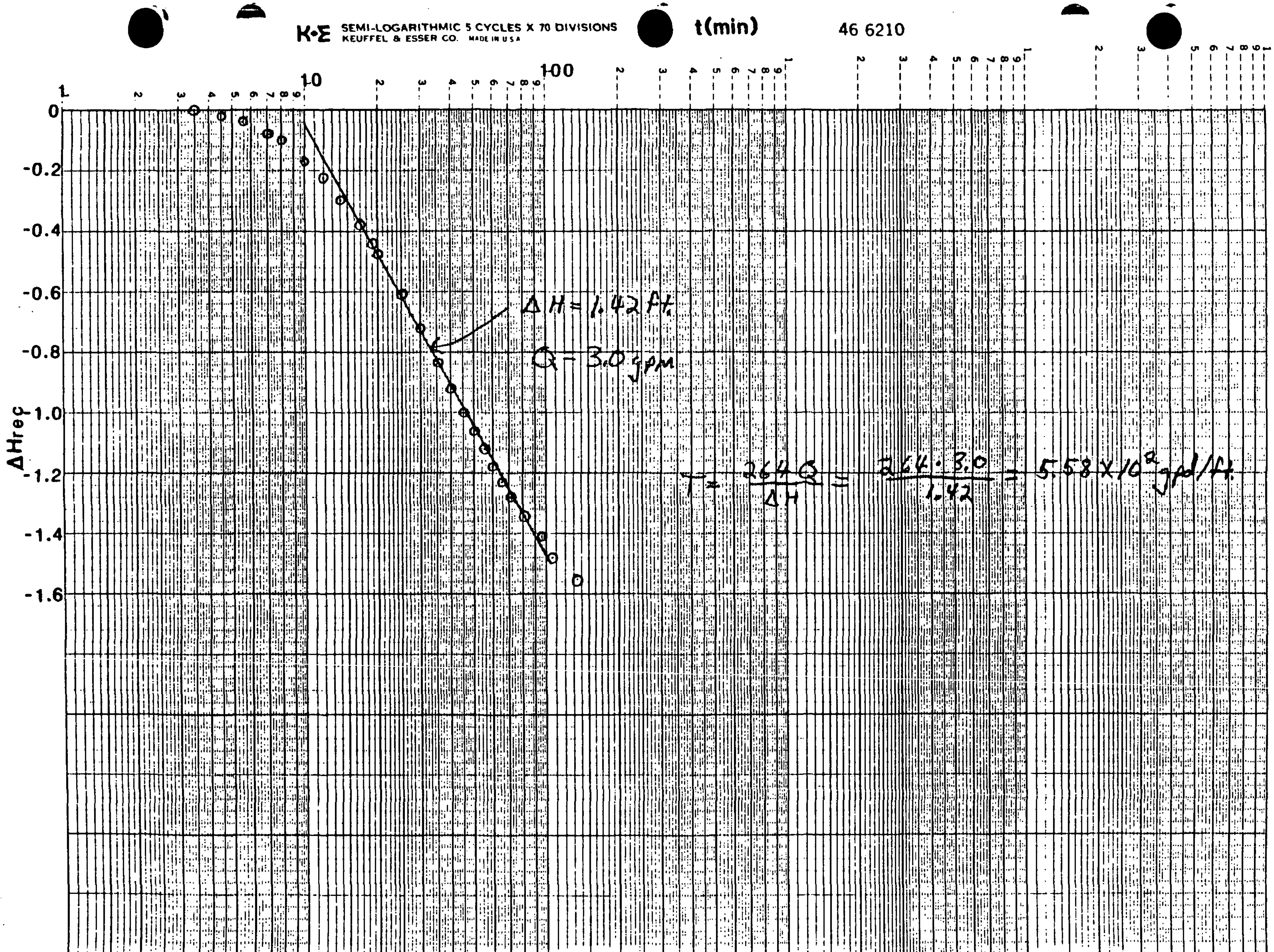




REI 3-3 PUMP TEST - RECOVERY

SEMI-LOG PLOT OF P3-3 8/12/86

PLOT BY M. BARRON



REI 3-3 PUMP TEST - RECOVERY
SEMI-LOG PLOT OF P3-3 8/12/86

PLOT BY M. BARRON

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 3-3 Calc for P3-3

COMPUTED BY: DRS DATE: [illegible]

CHECKED BY: ___ DATE: ___

Log-Log solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{114.6\, Q\, W(u)}{\Delta H}$$

where $W(u) = 1$

$Q = 3.0$ gpm

$\Delta H = 0.91$ ft $\quad T = \dfrac{(114.6)(3.0)}{0.91}$ $\quad$ $\boxed{3.78 \times 10^{2} \text{ gpd/ft}}$

× Conversion Factor 1.438×10^{-7} = $\boxed{5.43 \times 10^{-5} \text{ m}^2\text{/s}}$

Solution for Hydraulic Conductivity - Recovery

$K = \dfrac{T}{b}$ where b is the screened thickness in feet

$T = \boxed{3.78 \times 10^{2} \text{ gpd/ft}}$

$b = 14.0$ ft (?)*

$K = \dfrac{3.78 \times 10^{2}}{14.0}$ = $\boxed{2.70 \times 10^{1} \text{ gpd/ft}^2}$

× Conversion Factor 4.715×10^{-5} = $\boxed{1.27 \times 10^{-3} \text{ cm/s}}$

Semi-Log (a) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\, Q}{\Delta H_{res}}$$

$Q = 3.0$ gpm

$\Delta H_{res} = 1.54$ ft $\quad T = \dfrac{(264)(3.0)}{1.54}$ = $\boxed{5.14 \times 10^{2} \text{ gpd/ft}}$

× Conversion Factor 1.438×10^{-7} = $\boxed{7.40 \times 10^{-5} \text{ m}^2\text{/s}}$

* No boring log available. Thickness of screen for P3-3 based on boring log of REI 3-3.

ERT

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD

JOB NO.: 275-14

SUBJECT: REI 3-3 Calc for P3-3

COMPUTED BY: DCG DATE: 11/22

CHECKED BY: ___ DATE: ___

Solution for Hydraulic Conductivity - Recovery

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{5.14 \times 10^2 \text{ gpd/ft}}$

$b = 14.0 \text{ ft } (?)^*$

$$K = \frac{5.14 \times 10^2}{14.0} = \boxed{3.67 \times 10^1 \text{ gpd/ft}^2}$$

$$\times \text{ Conversion Factor } 4.715 \times 10^{-5} = \boxed{1.73 \times 10^{-3} \text{ cm/s}}$$

Semi-Log(t) solution for Transmissivity - Recovery

$$\text{Transmissivity } (T) = \frac{264\,Q}{\Delta H_{rec}}$$

$Q = 3.0 \text{ gpm}$

$\Delta H_{rec} = 1.42 \text{ ft}$ $$T = \frac{(264)(3.0)}{1.42} = \boxed{5.58 \times 10^2 \text{ gpd/ft}}$$

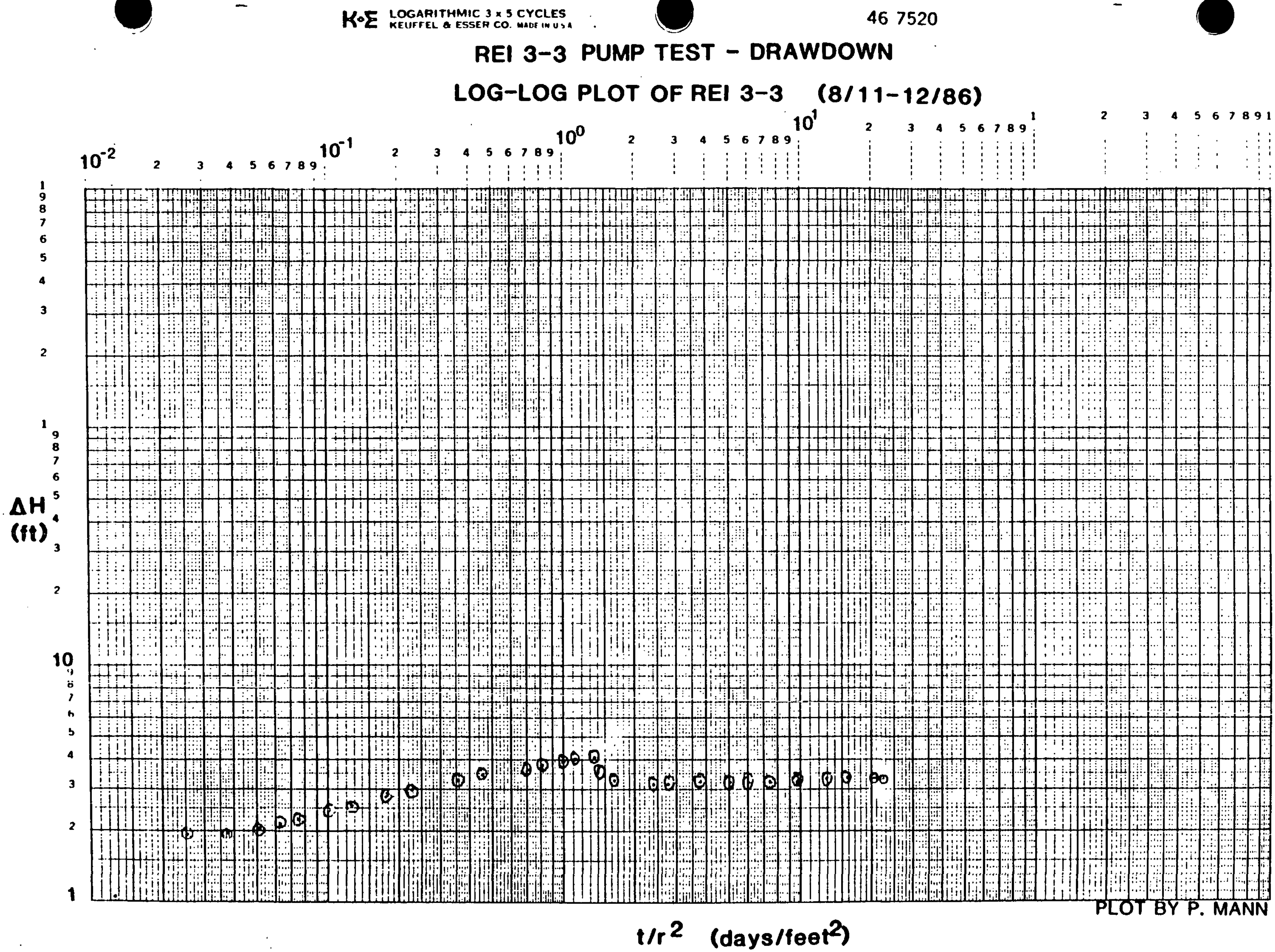
$$\times \text{ Conversion Factor } 1.438 \times 10^{-7} = \boxed{8.02 \times 10^{-5} \text{ m}^2\text{/s}}$$

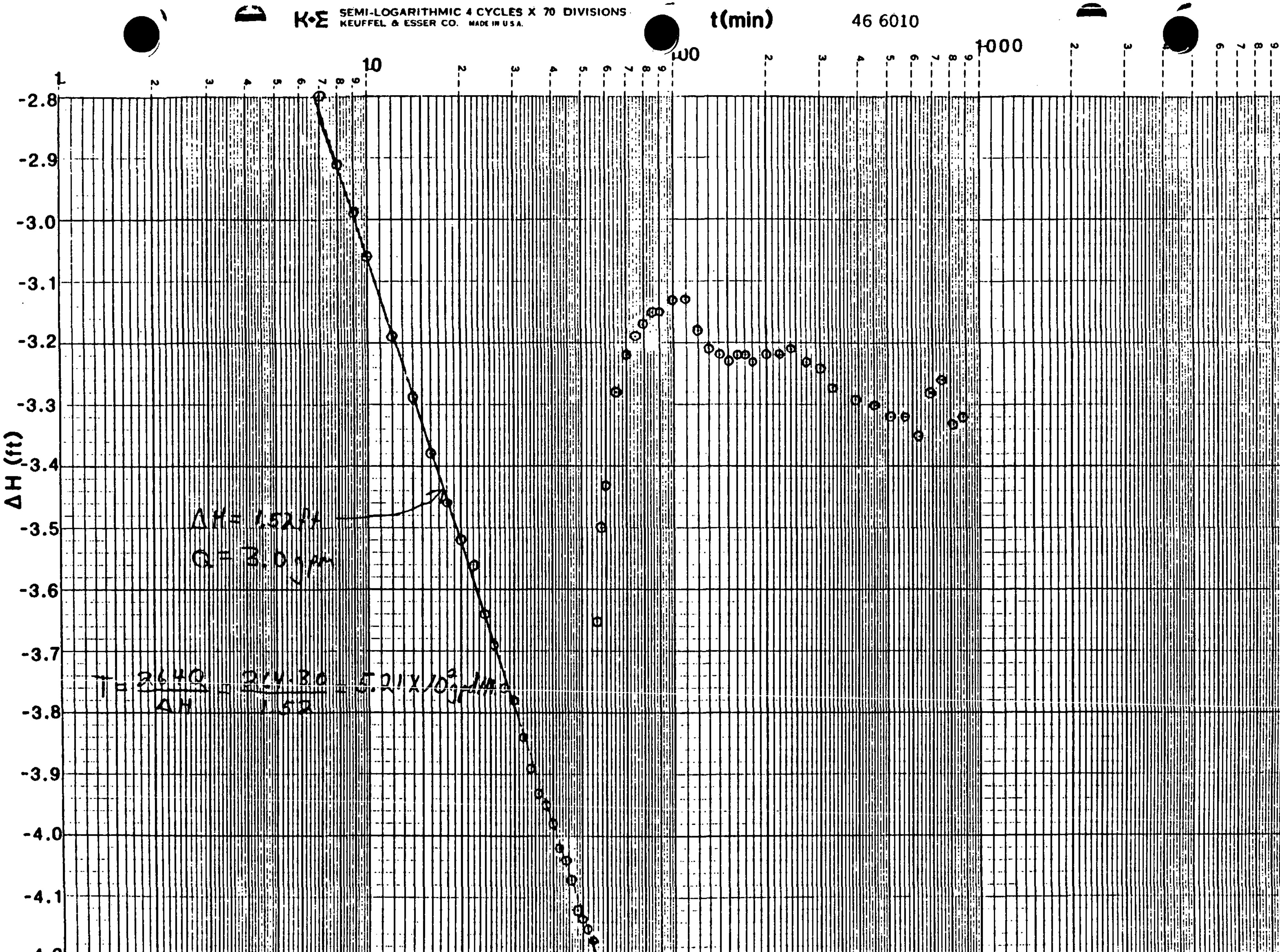
* No boring log available. Thickness of screen for P3-3 based on boring log of REI 3-3.

ERT

REI 3-3 PUMP TEST - DRAWDOWN

LOG-LOG PLOT OF REI 3-3 (8/11-12/86)





PLOT BY M. BARRON

REI 3-3 PUMP TEST - DRAWDOWN

SEMI-LOG PLOT OF REI 3-3 (8/11-12/86)

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: FRENCH LTD.

JOB NO.: 273-14

SUBJECT: REI 3-3 Calc. for REI 3-3

COMPUTED BY: DRS DATE:

CHECKED BY: ___ DATE: ___

Semi-Log solution for Transmissivity - Drawdown

$$\text{Transmissivity } (T) = \frac{264Q}{\Delta H}$$

$Q = 3.0$ gpm

$\Delta H = 1.52$ ft $\quad T = \frac{(264)(3.0)}{1.52} = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

X Conversion Factor $1.438 \times 10^{-7} = \boxed{7.49 \times 10^{-5} \text{ m}^2/\text{s}}$

Semi-Log solution for Storativity - Drawdown

$$\text{Storativity } (S) = \frac{0.3Tt_0}{r^2}$$

$r = 0.166$ ft

$t_0 = 9.3 \times 10^{-1}$ min $/1440 = 6.46 \times 10^{-4}$ days

$T = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

$$S = \frac{(0.3)(5.21 \times 10^2)(6.46 \times 10^{-4})}{(0.166)^2} = \boxed{3.66 \times 10^0}$$

Solutions for Hydraulic Conductivity (K)

$K = \frac{T}{b}$ where b is the screened thickness in feet.

$T = \boxed{5.21 \times 10^2 \text{ gpd/ft}}$

$b = 14.0$ ft

$$K = \frac{5.21 \times 10^2}{14.0} = \boxed{3.72 \times 10^1 \text{ gpd/ft}^2}$$

X Conversion Factor $4.715 \times 10^{-5} = \boxed{1.75 \times 10^{-3} \text{ cm/s}}$

ERT

1986 FIELD INVESTIGATION AND SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

VOLUME II - APPENDICES

FRENCH LIMITED SITE
CROSBY, TEXAS

PREPARED FOR

FRENCH LIMITED TASK GROUP

SUBMITTED TO

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION VI

TEXAS WATER COMMISSION

DECEMBER, 1986

275-14

RESOURCE ENGINEERING

3000 RICHMOND AVENUE, HOUSTON, TEXAS 77098, (713) 520-9900

Appendix 1

PCB Extraction and Analytical Procedures

ETC ENVIRONMENTAL TESTING and CERTIFICATION CORPORATION

July 10, 1986

Mr. Chris Itin
Resource Engineering
3000 Richmond Avenue
Houston, TX 77098

Dear Chris:

Enclosed for your review are the analytical and data reporting requirements ETC will use for the RES27511 project. The method and reporting requirements enclosed have been designed to eliminate as many variables as possible when performing an interlaboratory effort.

Please call us if there is any problem with this protocol presentation.

Sincerely,

Karen J. Kotz-Gebel

Karen Kotz-Gebel

KKG/lmd

Enclosure

Scope of Work

In order to obtain interlaboratory consistency in the analytical protocol ETC has identified several critical areas within the analytical scheme:

- Method of sample homogenization
- Sample extraction method and length of extraction
- Initial sample weight used
- Sample extract clean up
- Holding time.

To minimize analytical variables the above critical areas must be rigidly adhered to as described below under the "Analytical Protocol."

Analytical Protocol

I. Pre-Extraction Preparation

A. Sample Homogenization

Prior to sample extraction each sample must be homogenized. Due to the variable matrix of the samples some analytical judgement must be used here to determine the best method of homogenization. ETC, after receipt of sample, will give specifictions via telephone (to be followed by documentation) as to how each individual sample should be homogenized. ETC envisions that vigorous hand shaking of the sample bottle for one minute prior to taking an aliquot will be sufficient for liquid type samples. Alternately, for those samples containing mostly solids, physical stirring of the entire contents of the sample bottle in a large beaker should be performed with a stainless steel spatula for a set period of time. Whichever method of homogenization is performed, it must be documented and submitted along with the analytical results.

B. % Moisture Determination

Each sample must have a % moisture determination performed in conjunction with the extraction procedure. The method for the % moisture determination may be found in the IFB-CLP protocol "Organic Analysis Multi-Media Multi-Concentration." All data will then be reported on a dry weight basis.

II. Quality Control of Extraction Procedure

A. QC Requirements

For each 20 samples the following quality control must be performed:

1. One method blank
2. One replicate sample
3. One sample matrix spike.

B. Spiking Level

The matrix spike will consist of spiking Aroclor® 1242 at levels equivalent to 20 ppm (mg/kg) in the wet sample.

C. Holding time of all extractions are within 14 days of sample collection.

III. Sample Extraction and Clean up (unless otherwise specified by ETC after sample receipt)

A. Extraction

Extraction will be performed using SW-846 Method #3540 which is a soxhlet extraction procedure. The conditions for this extraction are:

1. Use a 30 gram wet weight sample
2. Extract with 1:1 Acetone/Hexane
3. Extract for 16 hours
4. Concentrate the extract to a final volume of 25 mls.

B. Silica Gel Clean up

A silica gel clean up column will be used on the extracts. A 5 ml. aliquot of the 25 ml. final volume will be passed through the clean up and then concentrated to a 5 ml. final volume. The effective concentration factor for the procedure will be approximately 1.0 (i.e. Initial weight, dry ÷ final volume). The following is a summary of the clean up procedure. It should be noted that the elution volume may vary depending upon the activity of the silica gel. Before performing the clean up a column recovery study should be performed using Aroclor 1016 and Aroclor 1260.

1. Charge a 20 mm bore chromatography column (equipped with a 250 ml. reservoir and stopcock) with 20 grams of activated silica gel. Place 1/2 inch of Na_2SO_4 on top of the silica gel column.

2. Pre-rinse the column with 60 ml of hexane.

3. When the hexane sinks just under the Na_2SO_4 layer close the stopcock and add the 5 ml. aliquot of the extract.

4. Open the stopcock and add 200 ml. of hexane as the extract sinks just under the Na_2SO_4 layer.

5. Discard the first 100 ml. of eluate.

6. Collect the second 100 ml. of eluate into a receiving vessel for subsequent concentration to 5 ml.

7. Discard any remaining eluate.

IV. Gas Chromatography Analysis

The following analytical protocol will be used to analyze the extracts by GC/ECD.

A. Primary Column Analysis

1. All 7 Aroclors must be analyzed
2. 3 levels of Aroclor 1242 must be analyzed so that a 3 point calibration curve will be used to calculate the matrix spike % recovery.
3. The level of standards used for quantitation should be such that a detection limit of 1-5 mg/kg is attained.

B. Confirmation Column Analysis

1. All primary column hits must be confirmed by second column confirmation with 3 levels of the Aroclor of interest.
2. All analytical results must be calculated using the 3 point calibration curve and all extract concentrations must fall within the calibrations curve.

Methodology for GC Analysis of Polychlorinated Biphenyls

The method employed in the analysis of your sample for polychlorinated biphenyls is an established EPA method taken from "Test Methods for Evaluating Solid Waste", July 1982.

The method can be summarized as follows: A weighed amount of homogenized sample, approximately 30 grams, is soxhlet extracted for 16 hours with hexane. The extract is dried and concentrated to approximately 25 ml. A 5 ml aliquot of the concentrated extract is transferred to a silica gel column and eluted with hexane. The eluate is concentrated to a final volume of 5 ml and injected into a gas chromatograph equipped with an ^{63}Ni electron capture detector.

The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

Summary of
Quality Assurance/Quality Control Procedures (QA/QC)

ETC bases its quality assurance protocols on the following government guidelines:

. "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019, March 1979;

. National Enforcement Investigation Center Policies, and Procedures manual; EPA-330/9/79/001-R, October 1979;

. the recommended guidelines for EPA Methods 624 and 625. (Federal Register, December 3, 1979; updated on October 26, 1984);

. "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980;

. "Determination of 2,3,7,8-TCDD in Soil and Sediment" EPA, Region VII, Kansas City, September 1983;

. Organic Analysis: Multi-media, Multi Concentration-IFB WA84-A267; and

. Dioxin Analysis:Soil/Sediment Matrix; Multi-Concentration; Selected Ion Monitoring with Jar Extration Procedure-IFB WA84-A002

However, we have modified our protocols to provide a higher level of QA/QC than the guidelines require. For example, we analyze a higher than required number of quality control samples and we pay especially careful attention to the certification of the "reference standard" compounds we use in analysis. Below are listed the key QA/QC elements for the methods we used.

Analysis of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry

- Each batch of 13 samples consists of 9 customer samples (at a maximum), one blank sample, one spiked blank, one spiked sample and one replicate sample. This amounts to a 30% quality control factor.
- Three surrogate compounds are added to each sample in the batch of 13.
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis.
- Each GC/MS is checked and retuned, if necessary, at the beginning of each day to ensure that its performance on bromofluorobenzene (BFB) meets the EPA criteria.
- A calibration curve for quantitation is prepared using a mixture of Volatile Organic Priority Pollutant "standards" at a minimum of 3 different concentrations and using a mixture of 3 internal standards at a constant concentration.
- The calibration curve is verified with a mixture of priority pollutant standards every day. If the response factors vary greater than 25%, the instrument must be recalibrated.

Analysis of Organic Compounds Extracted in Acid or Base/Neutral Solutions by Gas Chromatography/Mass Spectrometry

- Each batch of 20 samples consists of 16 customer samples (at a maximum), one blank sample, one spiked blank (for water matrices), one sample spiked with the priority pollutant standard mixture and a duplicate customer sample. This amounts to a 20% quality control factor.

Appendix 2

PCB Analytical Results - ETC

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9376	RESOURCE ENGINEERING	27514	IPCB1-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	105000a	2040	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	2040	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2040	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2040	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2040	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2040	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2040	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

Introduction

This report contains the analytical results on your sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Aroclors (PCB's by GC/ECD)

Aroclor mixtures analyzed by gas chromatographic methods are reported with a blank, spiked blank, matrix spike and replicate. The method detection limit (MDL) is determined for each individual matrix. When a particular Aroclor mixture is determined to be present at concentrations less than the calculated MDL it is reported as BMDL (Below Method Detection Limit).

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

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M9377	RESOURCE ENGINEERING	27514	IPCB1-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	73100 a	1870	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	1870	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1870	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1870	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1870	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1870	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1870	ND	ND	ND	0	-	ND	0	-

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9422	RESOURCE ENGINEERING	27514	IPCB1-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	315000A	2640	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	2640	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2640	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2640	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2640	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2640	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2640	ND	ND	ND	0	-	ND	0	-

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Aroclor 1242	59500 A	3440	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	3440	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3440	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3440	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3440	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3440	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3440	ND	ND	ND	0	-	ND	0	-

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AUG 27, 1986

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M9373	RESOURCE ENGINEERING	27514	IPCB2-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	14600 a	3860	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	3860	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3860	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3860	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3860	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3860	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3860	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9372	RESOURCE ENGINEERING	27514	IPCB2-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	20500 A	3580	7170A	8330A	ND	0	-	35200A	19700	113
Aroclor 1254	ND	3580	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3580	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3580	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3580	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3580	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3580	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9406	RESOURCE ENGINEERING	27514	IPCB3-I	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	ND	1500	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	1500	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1500	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1500	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1500	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1500	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1500	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9407	RESOURCE ENGINEERING	27514	IPCB3-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	28700 a	1210	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	1210	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1210	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1210	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1210	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1210	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1210	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9401	RESOURCE ENGINEERING	27514	IPCB3-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	17800 A	1480	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	1480	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1480	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1480	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1480	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1480	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1480	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9400	RESOURCE ENGINEERING	27514	IPCB4-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	44900 A	2380	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	2380	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2380	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2380	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2380	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2380	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2380	ND	ND	ND	0	-	ND	0	-

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M9412	RESOURCE ENGINEERING	27514	IPCB4-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	72100 A	2460	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	2460	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2460	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2460	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2460	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2460	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2460	ND	ND	ND	0	-	ND	0	-

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9413	RESOURCE ENGINEERING	27514	IPCB4-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	39400 a	3320	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3320	ND	ND	ND	0	-	ND	0	-

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M9387	RESOURCE ENGINEERING	27514	IPCB5-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	21700 A	1860	7170A	8330A	ND	0	-	35200A	19700	113
Aroclor 1254	ND	1860	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1860	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1860	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1860	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1860	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1860	ND	ND	ND	0	-	ND	0	-

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M9386	RESOURCE ENGINEERING	27514	IPCB5-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	21700 a	1920	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1920	ND	ND	ND	0	-	ND	0	-

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M9390	RESOURCE ENGINEERING	27514	IPCB5-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	4700 a	4570	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	4570	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4570	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4570	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4570	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4570	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4570	ND	ND	ND	0	-	ND	0	-

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M9391	RESOURCE ENGINEERING	27514	IPCB6-1	860716		
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	32900 a	1820	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	1820	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1820	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1820	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1820	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1820	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1820	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9392	RESOURCE ENGINEERING	27514	IPCB6-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	37700 A	2050	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	2050	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2050	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2050	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2050	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2050	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2050	ND	ND	ND	0	-	ND	0	-

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M9393	RESOURCE ENGINEERING	27514	IPCB6-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	20600 A	3680	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	3680	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3680	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3680	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3680	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3680	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3680	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9374	RESOURCE ENGINEERING	27514	IPCB7-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	24400 a	1690	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	1690	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1690	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1690	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1690	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1690	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1690	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9375	RESOURCE ENGINEERING	27514	IPCB7-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	4180 a	2420	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	2420	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2420	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2420	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2420	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2420	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2420	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9398	RESOURCE ENGINEERING	27514	IPCB7-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	16600 A	1140	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	1140	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1140	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1140	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1140	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1140	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1140	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9399	RESOURCE ENGINEERING	27514	IPCB8-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	25000 A	4410	17700A	14200A	ND	0	-	ND	19400	85
Aroclor 1254	ND	4410	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4410	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4410	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4410	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4410	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4410	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9426	RESOURCE ENGINEERING	27514	IPCB8-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	ND	5400	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	5400	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	5400	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	5400	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	5400	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	5400	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	5400	ND	ND	ND	0	-	ND	0	-

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

Summary of Quality Assurance/Quality Control Procedures (QA/QC)

ETC bases its quality assurance protocols on the following government guidelines:

- "Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019, March 1979;
- National Enforcement Investigation Center Policies, and Procedures manual; EPA-330/9/79/001-R, October 1979;
- the recommended guidelines for EPA Methods 624 and 625. (Federal Register, December 3, 1979; updated on October 26, 1984);
- "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980;
- "Determination of 2,3,7,8-TCDD in Soil and Sediment" EPA, Region VII, Kansas City, September 1983;
- Organic Analysis: Multi-media, Multi Concentration-IFB WA84-A267; and
- Dioxin Analysis:Soil/Sediment Matrix; Multi-Concentration; Selected Ion Monitoring with Jar Extration Procedure-IFB WA84-A002

However, we have modified our protocols to provide a higher level of QA/QC than the guidelines require. For example, we analyze a higher than required number of quality control samples and we pay especially careful attention to the certification of the "reference standard" compounds we use in analysis. Below are listed the key QA/QC elements for the methods we used.

Analysis of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry

- Each batch of 13 samples consists of 9 customer samples (at a maximun). one blank sample, one spiked blank, one spiked sample and one replicate sample. This amounts to a 30% quality control factor.
- Three surrogate compounds are added to each sample in the batch of 13.
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis.
- Each GC/MS is checked and retuned, if necessary, at the beginning of each day to ensure that its performance on bromofluorobenzene (BFB) meets the EPA criteria.
- A calibration curve for quantitation is prepared using a mixture of Volatile Organic Priority Pollutant "standards" at a minimum of 3 different concentrations and using a mixture of 3 internal standards at a constant concentration.
- The calibration curve is verified with a mixture of priority pollutant standards every day. If the response factors vary greater than 25%, the instrument must be recalibrated.

Analysis of Organic Compounds Extracted in Acid or Base/Neutral Solutions by Gas Chromatography/Mass Spectrometry

- Each batch of 20 samples consists of 16 customer samples (at a maximum), one blank sample, one spiked blank (for water matrices), one sample spiked with the priority pollutant standard mixture and a duplicate customer sample. This amounts to a 20% quality control factor.

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9427	RESOURCE ENGINEERING	27514	IPCB8-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	ND	4600	8700[A]	10200[A]	ND	0	-	ND	20300	80
Aroclor 1254	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4600	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9425	RESOURCE ENGINEERING	27514	IPCB9-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	1600	8700A	10200A	ND	0	-	ND	20300	80
Aroclor 1254	ND	1600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1600	ND	ND	ND	0	-	ND	0	-

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9424	RESOURCE ENGINEERING	27514	IPCB9-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	1460	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	1460	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1460	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1460	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1460	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1460	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1460	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

Introduction

This report contains the analytical results on your sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

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Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Aroclors (PCB's by GC/ECD)

Aroclor mixtures analyzed by gas chromatographic methods are reported with a blank, spiked blank, matrix spike and replicate. The method detection limit (MDL) is determined for each individual matrix. When a particular Aroclor mixture is determined to be present at concentrations less than the calculated MDL it is reported as BMDL (Below Method Detection Limit).

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors – GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9366	RESOURCE ENGINEERING	27514	IPCB9-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	7590	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	7590	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	7590	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	7590	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	7590	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	7590	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	7590	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

Introduction

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The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9367	RESOURCE ENGINEERING	27514	IPCB10-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	35800 A	2740	7170A	8330A	ND	0	-	35200A	19700	113
Aroclor 1254	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2740	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

Introduction

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9410	RESOURCE ENGINEERING	27514	IPCB10-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	7570 a	3730	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	3730	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3730	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3730	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3730	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3730	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3730	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

Introduction

This report contains the analytical results on your sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology
for
GC Analysis of Polychlorinated Biphenyls

The method employed in the analysis of your sample for polychlorinated biphenyls is an established EPA method taken from "Test Methods for Evaluating Solid Waste", July 1982.

The method can be summarized as follows: A weighed amount of homogenized sample, approximately 30 grams, is soxhlet extracted for 16 hours with hexane. The extract is dried and concentrated to approximately 25 ml. A 5 ml aliquot of the concentrated extract is transferred to a silica gel column and eluted with hexane. The eluate is concentrated to a final volume of 5 ml and injected into a gas chromatograph equipped with an ^{63}Ni electron capture detector.

The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8923	RESOURCE ENGINEERING	27514	IPCBI5-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	200000[A]	1000	144000[A]	132000[A]	ND	0	-	30000[A]	20000	12[B]
Aroclor 1254	ND	1000	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1000	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1000	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1000	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1000	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1000	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

Methodology
for
GC Analysis of Polychlorinated Biphenyls

The method employed in the analysis of your sample for polychlorinated biphenyls is an established EPA method taken from "Test Methods for Evaluating Solid Waste", July 1982.

The method can be summarized as follows: A weighed amount of homogenized sample, approximately 30 grams, is soxhlet extracted for 16 hours with hexane. The extract is dried and concentrated to approximately 25 ml. A 5 ml aliquot of the concentrated extract is transferred to a silica gel column and eluted with hexane. The eluate is concentrated to a final volume of 5 ml and injected into a gas chromatograph equipped with an ^{63}Ni electron capture detector.

The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8926	RESOURCE ENGINEERING	27514	IPCB12-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov.	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	151000[A]	4600	144000[A]	132000[A]	ND	0	-	30000[A]	20000	12[B]
Aroclor 1254	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4600	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

Methodology for GC Analysis of Polychlorinated Biphenyls

The method employed in the analysis of your sample for polychlorinated biphenyls is an established EPA method taken from "Test Methods for Evaluating Solid Waste", July 1982.

The method can be summarized as follows: A weighed amount of homogenized sample, approximately 30 grams, is soxhlet extracted for 16 hours with hexane. The extract is dried and concentrated to approximately 25 ml. A 5 ml aliquot of the concentrated extract is transferred to a silica gel column and eluted with hexane. The eluate is concentrated to a final volume of 5 ml and injected into a gas chromatograph equipped with an ^{63}Ni electron capture detector.

The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 1, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8928	RESOURCE ENGINEERING	27514	IPCB12-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	144000A	3600	144000A	132000A	ND	0	-	30000A	20000	12B
Aroclor 1254	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3600	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology
for
GC Analysis of Polychlorinated Biphenyls

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The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8925	RESOURCE ENGINEERING	27514	IPCB12-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	471000A	2800	144000A	132000A	ND	0	-	30000A	20000	12B
Aroclor 1254	ND	2800	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2800	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2800	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2800	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2800	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2800	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

Methodology
for
GC Analysis of Polychlorinated Biphenyls

The method employed in the analysis of your sample for polychlorinated biphenyls is an established EPA method taken from "Test Methods for Evaluating Solid Waste", July 1982.

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The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 1, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8929	RESOURCE ENGINEERING	27514	IPCB9-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	31000 a	1800	144000a	132000a	ND	0	-	30000a	20000	12a
Aroclor 1254	ND	1800	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1800	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1800	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1800	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1800	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1800	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology for GC Analysis of Polychlorinated Biphenyls

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The GC operating parameters were as follows:

COLUMN

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Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8927	RESOURCE ENGINEERING	27514	IPCB1-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	353000a	2740	144000a	132000a	ND	0	-	30000a	20000	12a
Aroclor 1254	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2740	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2740	ND	ND	ND	0	-	ND	0	-
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Aroclor 1016	ND	2740	ND	ND	ND	0	-	ND	0	-

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology
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The GC operating parameters were as follows:

COLUMN

6' x 4 mm glass 1.5% SP-2250 & 1.95% SP-2401
Supelcoport 100/120 mesh

CARRIER FLOW

60 ml/min. Argon/Methane

COLUMN OVEN

220° C

INJECTOR TEMPERATURE

225° C

DETECTOR TEMPERATURE

325° C

DETECTOR

Ni^{63} Electron Capture Detector

CONFIRMATION COLUMN

6' x 4 mm glass 3% OV-1
Supelcoport 100/120 mesh

ETC ENVIRONMENTAL TESTING and CERTIFICATION

NOV 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors – GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N8924	RESOURCE ENGINEERING	27514	IPCB1-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	277000A	2100	144000A	132000A	ND	0	-	30000A	20000	12B
Aroclor 1254	ND	2100	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2100	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2100	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2100	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2100	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2100	ND	ND	ND	0	-	ND	0	-

A Identification confirmed by second column analysis.

B Spiked samples that contain compounds present at high levels do not provide valid spike recovery data.

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Aroclors (PCB's by GC/ECD)

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9428	RESOURCE ENGINEERING	27514	IPCB22-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	ND	1010	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	1010	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1010	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1010	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1010	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1010	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1010	ND	ND	ND	0	-	ND	0	-

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M9429	RESOURCE ENGINEERING	27514	IPCB22-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	2880 A	1040	6670A	10800A	ND	0	-	8760A	27400	123
Aroclor 1254	ND	1040	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1040	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1040	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1040	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1040	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1040	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9396	RESOURCE ENGINEERING	27514	IPCB21-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov.	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov.
Aroclor 1242	ND	1300	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1300	ND	ND	ND	0	-	ND	0	-

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Aroclors – GC Analysis Data (QR14)

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M9395	RESOURCE ENGINEERING	27514	IPCB21-2	860716		
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	1300	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1300	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1300	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

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M9394	RESOURCE ENGINEERING	27514	IPCB21-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	ND	2200	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	2200	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2200	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2200	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2200	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2200	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2200	ND	ND	ND	0	-	ND	0	-

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9397	RESOURCE ENGINEERING	27514	IPCB20-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	13100 a	800	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	800	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	800	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	800	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	800	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	800	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	800	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9389	RESOURCE ENGINEERING	27514	IPCB20-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	12300 a	890	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	890	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	890	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	890	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	890	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	890	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	890	ND	ND	ND	0	-	ND	0	-

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9388	RESOURCE ENGINEERING	27514	IPCB20-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	10580 a	1080	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	1080	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1080	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1080	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1080	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1080	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1080	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

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Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9405	RESOURCE ENGINEERING	27514	IPCB19-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	38500 a	2780	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	2780	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2780	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2780	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2780	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2780	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2780	ND	ND	ND	0	-	ND	0	-

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M9404	RESOURCE ENGINEERING	27514	IPCB19-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	8960 A	2280	6670A	10800A	ND	0	-	8760A	27400	123
Aroclor 1254	ND	2280	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2280	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2280	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2280	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2280	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2280	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9418	RESOURCE ENGINEERING	27514	IPCB18-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	41600 *	10600	6670*	10800*	ND	0	-	8760*	27400	123
Aroclor 1254	ND	10600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	10600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	10600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	10600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	10600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	10600	ND	ND	ND	0	-	ND	0	-

* Identification confirmed by second column analysis.

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9419	RESOURCE ENGINEERING	27514	IPCB18-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	34400 a	17500	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	17500	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	17500	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	17500	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	17500	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	17500	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	17500	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9384	RESOURCE ENGINEERING	27514	IPCB17-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	1900	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	1900	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1900	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1900	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1900	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1900	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1900	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9402	RESOURCE ENGINEERING	27514	IPCB17-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	3460 a	1920	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1920	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1920	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9385	RESOURCE ENGINEERING	27514	IPCB17-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	9450 a	2300	8700 a	10200 a	ND	0	-	ND	20300	80
Aroclor 1254	ND	2300	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2300	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2300	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2300	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2300	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2300	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

FTC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9381	RESOURCE ENGINEERING	27514	IPCB16-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	8700 a	2080	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	2080	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2080	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2080	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2080	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2080	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2080	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports						
M9380	RESOURCE ENGINEERING	27514	IPCB16-2	860716		
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	3420 a	2600	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	2600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2600	ND	ND	ND	0	-	ND	0	-

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M9414	RESOURCE ENGINEERING	27514	IPCB16-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	21400 a	3260	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	3260	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3260	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3260	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3260	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3260	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3260	ND	ND	ND	0	-	ND	0	-

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9415	RESOURCE ENGINEERING	27514	IPCBI5-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	98600 a	10300	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	10300	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	10300	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	10300	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	10300	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	10300	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	10300	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports						
M9409	RESOURCE ENGINEERING	27514	IPCB14-3	860719		
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	13500 a	1780	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	1780	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	1780	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	1780	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	1780	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	1780	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	1780	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9421	RESOURCE ENGINEERING	27514	IPCB14-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	40300 a	28500	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	28500	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	28500	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	28500	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	28500	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	28500	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	28500	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9420	RESOURCE ENGINEERING	27514	IPCB14-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	41400 *	15000	6670*	10800*	ND	0	-	8760*	27400	123
Aroclor 1254	ND	15000	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	15000	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	15000	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	15000	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	15000	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	15000	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9408	RESOURCE ENGINEERING	27514	IPCB13-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	6670 a	5970	6670a	10800a	ND	0	-	8760a	27400	123
Aroclor 1254	ND	5970	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	5970	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	5970	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	5970	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	5970	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	5970	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9431	RESOURCE ENGINEERING	27514	IPCB13-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	3600	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3600	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3600	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9430	RESOURCE ENGINEERING	27514	IPCB13-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	19300 a	2120	8700a	10200a	ND	0	-	ND	20300	80
Aroclor 1254	ND	2120	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2120	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2120	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2120	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2120	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2120	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9369	RESOURCE ENGINEERING	27514	IPCB12-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	244000A	4770	7170A	8330A	ND	0	-	35200A	19700	113
Aroclor 1254	ND	4770	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4770	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4770	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4770	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4770	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4770	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

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ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9368	RESOURCE ENGINEERING	27514	IPCB12-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	693000a	3320	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3320	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3320	ND	ND	ND	0	-	ND	0	-

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Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9417	RESOURCE ENGINEERING	27514	IPCB12-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	243000a	2010	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	2010	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2010	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2010	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2010	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2010	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2010	ND	ND	ND	0	-	ND	0	-

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9416	RESOURCE ENGINEERING	27514	IPCB11-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	15200 a	3130	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3130	ND	ND	ND	0	-	ND	0	-

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M9379	RESOURCE ENGINEERING	27514	IPCB11-2	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	ND	4230	7170a	8330a	ND	0	-	35200a	19700	113
Aroclor 1254	ND	4230	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	4230	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	4230	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	4230	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	4230	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	4230	ND	ND	ND	0	-	ND	0	-

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M9378	RESOURCE ENGINEERING	27514	IPCB11-1	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
Aroclor 1242	7170 A	2810	7170A	8330A	ND	0	-	35200A	19700	113
Aroclor 1254	ND	2810	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	2810	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	2810	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	2810	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	2810	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	2810	ND	ND	ND	0	-	ND	0	-

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Aroclors (PCB's by GC/ECD)

Aroclor mixtures analyzed by gas chromatographic methods are reported with a blank, spiked blank, matrix spike and replicate. The method detection limit (MDL) is determined for each individual matrix. When a particular Aroclor mixture is determined to be present at concentrations less than the calculated MDL it is reported as BMDL (Below Method Detection Limit).

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Aroclors - GC Analysis Data (QR14)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9411	RESOURCE ENGINEERING	27514	IPCB10-3	860716		

Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
Aroclor 1242	17700 a	3130	17700a	14200a	ND	0	-	ND	19400	85
Aroclor 1254	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1260	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1248	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1232	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1221	ND	3130	ND	ND	ND	0	-	ND	0	-
Aroclor 1016	ND	3130	ND	ND	ND	0	-	ND	0	-

a Identification confirmed by second column analysis.

Appendix 3

PCB Analytical Results - Rocky Mountain

SAMPLE DESCRIPTION INFORMATION

for

Resource Engineering ERT

RMA Sample No.	Sample Description	Sample Type	Date Sampled	Date Received
61783-01	1-1	Sludge	07/16/86	07/19/86
61783-02	2-2	Sludge	07/16/86	07/19/86
61783-03	3-3	Sludge	07/16/86	07/19/86
61783-04	4-1	Sludge	07/16/86	07/19/86
61783-05	7-2	Sludge	07/16/86	07/19/86
61783-06	9-2	Sludge	07/16/86	07/19/86
61783-07	11-2	Sludge	07/16/86	07/19/86
61783-08	13-2	Sludge	07/16/86	07/19/86
61783-09	17-2	Sludge	07/16/86	07/19/86
61783-10	20-1	Sludge	07/16/86	07/19/86

August 27, 1986

ANALYTICAL RESULTS

for

Resource Engineering ERT

PCBs

Parameter	Units	61783-01		61783-02		61783-03		61783-04	
Aroclor 1016	mg/Kg	ND	(3.2)	ND	(1.6)	ND	(0.16)	ND	(3.2)
Aroclor 1221	mg/Kg	ND	(3.2)	ND	(1.6)	ND	(0.16)	ND	(3.2)
Aroclor 1232	mg/Kg	ND	(3.2)	ND	(1.6)	ND	(0.16)	ND	(3.2)
Aroclor 1242	mg/Kg	64	(3.2)	28	(1.6)	3.2	(0.16)	57	(3.2)
Aroclor 1248	mg/Kg	ND	(3.2)	ND	(1.6)	ND	(0.16)	ND	(3.2)
Aroclor 1254	mg/Kg	ND	(20)	ND	(10)	ND	(1)	ND	(20)
Aroclor 1260	mg/Kg	ND	(20)	ND	(10)	ND	(1)	ND	(20)

Parameter	Units	61783-05		61783-06		61783-07		61783-08	
Aroclor 1016	mg/Kg	ND	(0.16)	ND	(1.6)	ND	(0.16)	ND	(1.6)
Aroclor 1221	mg/Kg	ND	(0.16)	ND	(1.6)	ND	(0.16)	ND	(1.6)
Aroclor 1232	mg/Kg	ND	(0.16)	ND	(1.6)	ND	(0.16)	ND	(1.6)
Aroclor 1242	mg/Kg	9.0	(0.16)	34	(1.6)	2.3	(0.16)	32	(1.6)
Aroclor 1248	mg/Kg	ND	(0.16)	ND	(1.6)	ND	(0.16)	ND	(1.6)
Aroclor 1254	mg/Kg	ND	(1)	ND	(10)	ND	(1)	ND	(10)
Aroclor 1260	mg/Kg	ND	(1)	ND	(10)	ND	(1)	ND	(10)

Parameter	Units	61783-09		61783-10	
Aroclor 1016	mg/Kg	ND	(0.16)	ND	(1.6)
Aroclor 1221	mg/Kg	ND	(0.16)	ND	(1.6)
Aroclor 1232	mg/Kg	ND	(0.16)	ND	(1.6)
Aroclor 1242	mg/Kg	2.0	(0.16)	5.1	(1.6)
Aroclor 1248	mg/Kg	ND	(0.16)	ND	(1.6)
Aroclor 1254	mg/Kg	ND	(1)	ND	(10)
Aroclor 1260	mg/Kg	ND	(1)	ND	(10)

ND = Not detected.

Detection limits in parentheses.

Appendix 4

PCB Analytical Results - Radian

RADIAN
CORPORATION

REI ERT DATA PACKAGE

Radian Analytical Services, Sacramento

Laboratory I.D.# S6-07-044

This data package consists of the following support documentation:

1. Chain of Custody Record (External)
2. Chain of Custody Record (Internal, also see Ext./Inst. log pages)
3. Homogenization Procedure Summary
4. Extraction Logbook Page
5. Instrument Logbook Page
6. Method Blank, Standard, and Sample Chromatograms
   (Quantitation and Confirmation Columns)

RESOURCE ENGINEERING - ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME	LOCATION
275-14	French Limited	Crosby, Texas

FIELD SAMPLE NUMBER	DATE	TIME	GRAB	COMP.	SAMPLE CONTAINER (SIZE/MAT'L)	SAMPLE TYPE (LIQUID, SLUDGE, ETC.)	PRESERVATIVE	ANALYSIS REQUESTED	COMMENTS AND HOLD STORAGE DATE
PCB-1-1	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None
PCB-2-2	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None
PCB-3-3	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None
PCB-4-1	7/16/86	PM	✓		500 ml glass jar	Sludge	4°C	PCB OK	None
PCB-7-2	7/16/86	PM	✓		500 ml glass jar	Sludge	4°C	PCB OK	None
PCB-9-2	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None
PCB-11-2	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None
PCB-13-2	7/16/86	PM	✓		500 ml glass jar	Sludge	4°C	PCB OK	None
PCB-17-2	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None

LAB SAMPLE NO.

REMARKS: See Enclosed Instructions

SAMPLER SIGNATURE: WTBeck

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
WTBeck	7/18/86	5pm	W Brown 7/20/86				
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)

PROJECT NO.

RESOURCE ENGINEERING - ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME	LOCATION
275-14	French Limited	Crosby, Texas

FIELD SAMPLE NUMBER	DATE	TIME	GRAB	COMP.	SAMPLE CONTAINER (SIZE/MAT'L)	SAMPLE TYPE (LIQUID SLUDGE, ETC.)	PRESER-VATIVE	ANALYSIS REQUESTED	COMMENTS AND HOLD STORAGE DATE
PCB-20-1	7/16/86	PM	✓		500 ml glass jar	sludge	4°C	PCB OK	None

LAB SAMPLE NO.	REMARKS	SAMPLER SIGNATURE
	See Enclosed Instructions	WTBeck

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
WTBeck	7/18/86	5pm	[illegible] 7/20/86				
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)	RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY (SIGNATURE)

PROJECT NO.

RADIAN CORPORATION

(Internal)

PAGE 1 RAS Sacramento CHAIN OF CUSTODY ORD # S6-07-044

RCVD: 07/~~20~~ 19/86 DUE: 08/~~03~~ 02/86 07/21/86 09:17:07 KEEP: 10/02/86 DISP: D

DASH	SAMPLE IDENTIFICATION	STORED	TESTS		
01A	PCB-1-1 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
02A	PCB-2-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
03A	PCB-3-3 Aoil	sac:refrig	8080PB	DRY_WT	EX_PCB
04A	PCB-4-1 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
05A	PCB-7-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
06A	PCB-9-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
07A	PCB-11-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
08A	PCB-13-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
09A	PCB-17-2 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
10A	PCB-20-1 Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
11A	Matrix Spike Soil	sac:refrig	8080PB	DRY_WT	EX_PCB
12A	Duplicate Analysis	sac:refrig	8080PB	DRY_WT	EX_PCB
13A	Reagent Blank	sac:refrig	8080PB	DRY_WT	EX_PCB

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
Wanda Brown	7/19/86	Walk-in	7/19/86		
WALK-IN P.D.	7/22/86	EXTRACTIONS P.D.	7/22/86	RETURNED TO WALKIN P.D.	7/22/86
Extractions PL	7/24-25/86	Concentrations PL	7/24-25/86	extracts refrigerator PL	7/24-25/86
extracts refrigerator . LC	7/31+8/1 PL	Silica Gel Cleanup LC	7/31+8/1/86	concentrations PL	7/31/86+8/1/86
concentrations PL	7/31+8/1/86	extracts freezer PL	7/31+8/1/86		

RADIAN CORPORATION

Homogenization Procedure

RADIAN DC # ____-____-20

LABORATORY NARRATIVE LOG

CASE NUMBER: REI-ERT

SAM NUMBER: 5607044

SAMPLE ID	FRACTION	INITIAL	PROBLEM AND SOLUTION OR WORK AROUND
PCB 1-1	1A	P.D. 9/8	HOMOGENIZATION PROCEDURE:
PCB 2-2	2A		
PCB 3-3	3A		1) PUT SAMPLE INTO A solvent rinsed 500 ml
PCB 4-1	4A		beaker;
PCB 7-2	5A		2) STIR sample for two MINUTES;
PCB 9-2	6A		
PCB 11-2	7A		3) USE 30 grams of the stirred sample
PCB 13-2	8A		for analysis.
PCB 17-2	9A		
PCB 20-1	10A		
MS of 2A	11A		
DUP of 7A	12A		
REAGENT blank	13A		
CB0724PCB000	—		

SOIL EXTRACTION LOG

Client	SAM # 84-	ID Code	Frac #	Ext Type	Ext Date/ Analyst	Sample Vol	(mL) Final Vol	Dry WT	pH	Location (Box #)	Conc Date Analyst
REI-ERT	5607044	PCB 1-1	1A^{H}	PCB	7/23 P.D	29.73 g	25.0 ml	0.41		8	7/31 PL
		PCB 2-2	2A^{H}			30.48 g		0.21			8/1 PL
		PCB 3-3	3A^{H}			31.27 g		0.53			8/1 PL
		PCB 4-1	4A^{H}			30.13 g		0.37			8/1 PL
		PCB 7-2	5A^{H}			30.10 g		0.36			7/31 PL
		PCB 9-2	6A^{H}		7/24 P.D	29.41 g		0.45			8/1 PL
		PCB 11-2	7A^{H}			29.59 g		0.20			7/31 PL
		PCB 13-2	8A^{H}			30.04 g		0.20			7/31 PL
		PCB 17-2	9A^{H}			29.52 g		0.40			8/1 PL
		PCB 20-1	10A^{H}			29.75 g		0.40		MS	7/31 PL
		MS OF 2A	11A^{H}		P.D. 7/23	30.31 g		0.21		Dup	8/1 PL
		DUP OF 7A	12A^{H}			30.37 g		0.20			7/31 PL
		REAGENT BLANK	13A^{H}			—		—			8/1 PL
		CB0725PCB 000^{H}				—		—			8/1 PL

Solvent Type/Volume/Lot #: Hexane / 350 ml / AN991

Surrogate Spike:

Matrix Spike: 600 ml of 86-18

Notebook Reference:

Lab Narrative Attached: No ☐ Yes ☒

Comments: Concentrate in ~~Hexane~~ to 25 ml (5 mls of this taken thru Silica Gel Cleanup → Final Vol. 5 mls.)

NOTE: THAT THIS GROUP IS DISTINGUISHED FROM THE Hexane: Acetone FRACTIONS BY THE LETTER 'H.'

(Instrument log)

TLE REI/ERT PCB's

Project No.

Book No.

From Page No.

Columns (1-1)(MP) 1.5% SP2250/1.95% SP2401 (1-2)(SP) 3% SP2100 6'x2mm I.D. glass
N_2 flows (1-1)(MP) 26 ml/min (1-2)(SP) 29 ml/min Temps. Columns 192°C Isothermal
Injector 210°C, Detectors 300°C (ECD) Range = 10 Intg. see back

File #	Vol. Inj.	Sample or Standard I.D.	Concentration		Analyst	Comments
1/2-60806-01	1/2 ul	12623-20AAR 1221/1254 (2)	1000 ng/ml		RY	REI/ERT PCB's
02		12623-17AAR 1232 (2)	1000 ng/ml			
03		12623-19AAR 1248 (2)	500 ng/ml			
04		12623-16BAR 1016/1260 (3)	125/250 ng/ml			
05		Hexane Rinse				
06		12623-16AAR 1016/1260 (2)	500/1000 ng/ml			
07		Hexane Rinse				
08		12623-16AR 1016/1260 (1)	2500/5000 ng/ml			
09		Hexane Rinse				
10		12623-18BAR 1242 (3)	125 ng/ml			
11		12623-18AAR 1242 (2)	500 ng/ml			
12		12623-18AR 1242 (1)	2500 ng/ml			
13		8607044-1A	29.73g → 25.0ml	1:200		
14		8607044-2A	30.48g → 25.0ml	1:20		
15		8607044-3A	31.27g → 25.0ml	1:20		
16		8607044-4A	30.13g → 25.0ml	1:50		
17		8607044-5A	30.10g → 25.0ml	1:40		
18		8607044-6A	29.41g → 25.0ml	1:200		
19		8607044-7A	29.59g → 25.0ml	1:4		
20		8607044-8A	30.04g → 25.0ml	1:40		
21		8607044-9A	29.52g → 25.0ml	1:4		
22		12623-18AAR 1242 (2)	500 ng/ml			
23		8607044-10A	29.75g → 25.0ml	1:40		
24		8607044-11A	30.31g → 25.0ml	1:25		
25		8607044-12A	30.37g → 25.0ml	1:4		
26		8607044-13A	→ 25.0ml			
27		CB0724PCB00D	→ 25.0ml			
28		8607044-2A-AH	30.23g → 25.0ml	1:40		
29		8607044-5A-AH	30.45g → 25.0ml	1:20		
30		12623-18AAR 1242 (2)	500 ng/ml			
31		8607044-17A	30.37g → 25.0ml	1:10		

To Page No.

Witnessed & Understood by me, | Date | Invented by | Date

Recorded by

RADIAN
CORPORATION

RAS Sacramento REPORT Work Order # S6-07-044
Received: 07/19/86 09/08/86 11:18:31

REPORT	Resource Engineering, Inc.	PREPARED	Radian Analytical Services
TO	Tom Beck	BY	8501 Mo-pac Bl.
	3000 Richmond Avenue		PO Box 9948
	Houston, Texas 77098		Austin, TX 78751
ATTEN	Mr. Chris Itin-REI/ERT	ATTEN	
		PHONE	512-454-4797

Lucosa Petkovsek
CERTIFIED BY

CONTACT PETKOVSEK

CLIENT	REI ERT SAMPLES 14
COMPANY	Radian Corporation
FACILITY	Resource Engineering, Inx.
	Houston, Texas
WORK ID	Crosby, Texas, French Limited
TAKEN	7/16/86
TRANS	Fed Ex 598437976
TYPE	Soil PCBs
P.O. #	275-14
INVOICE	under separate cover

All results reported in ug/kg dry weight.
Fraction -01B(Sample PCB-1-1) analyzed as crude extract(no clean-up) as per client request.

Previously Reported on 09/05/86.

SAMPLE IDENTIFICATION

01	PCB-1-1 Soil
01	PCB-1-1 Soil-Crude Extract
02	PCB-2-2 Soil
03	PCB-3-3 Soil
04	PCB-4-1 Soil
05	PCB-7-2 Soil
06	PCB-9-2 Soil
07	PCB-11-2 Soil
08	PCB-13-2 Soil
09	PCB-17-2 Soil
10	PCB-20-1 Soil
11	PCB-2-2 Matrix Spike Soil
12	PCB-11-2 Duplicate Analys.
13	Reagent Blank

TEST CODES and NAMES used on this report

8080PB	PCBs in soil
DRY WT	Dry weight determination
EX PCB	Extraction for PCB

Received: 07/19/86 Results By Test

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)	Sample 04 (entered units)	Sample 05 (entered units)
DRY_WT % moisture	59	79	47	63	64
EX_PCB date completed	07/21/86	07/21/86	07/21/86	07/21/86	07/21/86

TEST CODE default units	Sample 06 (entered units)	Sample 07 (entered units)	Sample 08 (entered units)	Sample 09 (entered units)	Sample 10 (entered units)
DRY_WT % moisture	55	80	80	60	60
EX_PCB date completed	07/21/86	07/21/86	07/21/86	07/21/86	07/21/86

TEST CODE default units	Sample 11 (entered units)	Sample 12 (entered units)	Sample 13 (entered units)
EX_PCB date completed	no data	no data	no data

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results By Test

Work Order # S6-07-044

SAMPLE Sample Id	Test: DRY WT % moisture	Test: EX PCB date completed
01 PCB-1-1 Soil	59	07/21/86
02 PCB-2-2 Soil	79	07/21/86
03 PCB-3-3 Soil	47	07/21/86
04 PCB-4-1 Soil	63	07/21/86
05 PCB-7-2 Soil	64	07/21/86
06 PCB-9-2 Soil	55	07/21/86
07 PCB-11-2 Soil	80	07/21/86
08 PCB-13-2 Soil	80	07/21/86
09 PCB-17-2 Soil	60	07/21/86
10 PCB-20-1 Soil	60	07/21/86
11 PCB-2-2 Matrix		no data
12 PCB-11-2 Duplic		no data
13 Reagent Blank		no data

RAS Sacramento REPORT
Work Order # S6-07-044
Received: 07/19/86
Results by Sample

SAMPLE ID PCB-1-1 Soil
SAMPLE # 01 FRACTIONS: A
Date & Time Collected 07/16/86
Category

DRY_WT 59	EX_PCB 07/21/86
% moisture	date completed

RADIAN
CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-1-1 Soil

FRACTION 01A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY
INSTRMT 1

EXTRCTD 07/23/86
INJECTD 08/06/86

FILE # 116080613

UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	8200
11104-28-2	PCB-1221	ND	16000
11141-16-5	PCB-1232	ND	16000
53469-21-9	PCB-1242	360000	8200
12672-29-6	PCB-1248	ND	8200
11097-69-1	PCB-1254	ND	16000
11096-82-5	PCB-1260	ND	16000

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-1-1 Soil-Crude Extract FRACTION 01B TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED LFM

ANALYST RY
INSTRMT 1

EXTRCTD 07/23/86
INJECTD 08/25/86

FILE # 116082504

UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	42000
11104-28-2	PCB-1221	ND	83000
11141-16-5	PCB-1232	ND	83000
53469-21-9	PCB-1242	400000	42000
12672-29-6	PCB-1248	ND	42000
11097-69-1	PCB-1254	ND	83000
11096-82-5	PCB-1260	ND	83000

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

SAMPLE ID PCB-2-2 Soil SAMPLE # 02 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 79	EX_PCB 07/21/86
% moisture	date completed

RADIAN CORPORATION

 RAS Sacramento REPORT Work Order # S6-07-044

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-2-2 Soil FRACTION 02A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/23/86 FILE # 116080614

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	1600
11104-28-2	PCB-1221	ND	3200
11141-16-5	PCB-1232	ND	3200
53469-21-9	PCB-1242	38000	1600
12672-29-6	PCB-1248	ND	1600
11097-69-1	PCB-1254	ND	3200
11096-82-5	PCB-1260	ND	3200

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-3-3 Soil

SAMPLE # 03 FRACTIONS: A

Date & Time Collected 07/16/86 Category

DRY_WT 47 (% moisture) EX_PCB 07/21/86 (date completed)

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-3-3 Soil

FRACTION 03A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/23/86 FILE # 116080615
INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	600
11104-28-2	PCB-1221	ND	1200
11141-16-5	PCB-1232	ND	1200
53469-21-9	PCB-1242	12000	600
12672-29-6	PCB-1248	ND	600
11097-69-1	PCB-1254	ND	1200
11096-82-5	PCB-1260	ND	1200

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-4-1 Soil SAMPLE # 04 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 63	EX_PCB 07/21/86
% moisture	date completed

RADIAN
CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-4-1 Soil

FRACTION 04A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/23/86 FILE # 116080616
INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	2200
11104-28-2	PCB-1221	ND	4400
11141-16-5	PCB-1232	ND	4400
53469-21-9	PCB-1242	84000	2200
12672-29-6	PCB-1248	ND	2200
11097-69-1	PCB-1254	ND	4400
11096-82-5	PCB-1260	ND	4400

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-7-2 Soil SAMPLE # 05 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 64 (% moisture) EX_PCB 07/21/86 (date completed)

RADIAN CORPORATION

 RAS Sacramento REPORT Work Order # 56-07-044
Received: 07/19/86 Results by Sample

SAMPLE ID PCB-7-2 Soil FRACTION 05A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM
ANALYST RY EXTRCTD 07/23/86 FILE # 116080617
INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	1900
11104-28-2	PCB-1221	ND	3800
11141-16-5	PCB-1232	ND	3800
53469-21-9	PCB-1242	28000	1900
12672-29-6	PCB-1248	ND	1900
11097-69-1	PCB-1254	ND	3800
11096-82-5	PCB-1260	ND	3800

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

SAMPLE ID PCB-9-2 Soil SAMPLE # 06 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 55	EX_PCB 07/21/86
% moisture	date completed

RADIAN CORPORATION

RAS Sacramento REPORT

Work Order # S6-07-044

Received: 07/19/86

Results by Sample

SAMPLE ID PCB-9-2 Soil

FRACTION 06A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/24/86 FILE # 116080618

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	7600
11104-28-2	PCB-1221	ND	15000
11141-16-5	PCB-1232	ND	15000
53469-21-9	PCB-1242	120000	7600
12672-29-6	PCB-1248	ND	7600
11097-69-1	PCB-1254	ND	15000
11096-82-5	PCB-1260	ND	15000

NOTES AND DEFINITIONS FOR THIS REPORT.

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NA = not analyzed.
NS = not spiked.
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SAMPLE ID PCB-11-2 Soil SAMPLE # 07 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT	EX_PCB
80	07/21/86
% moisture	date completed

RADIAN CORPORATION

 RAS Sacramento REPORT Work Order # S6-07-044

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-11-2 Soil FRACTION 07A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/24/86 FILE # 116080619

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	340
11104-28-2	PCB-1221	ND	680
11141-16-5	PCB-1232	ND	680
53469-21-9	PCB-1242	3800	340
12672-29-6	PCB-1248	ND	340
11097-69-1	PCB-1254	ND	680
11096-82-5	PCB-1260	ND	680

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

 RAS Sacramento REPORT Work Order # S6-07-044
Received: 07/19/86 Results by Sample

SAMPLE ID PCB-13-2 Soil SAMPLE # 08 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT	80	EX_PCB	07/21/86
	% moisture		date completed

RADIAN CORPORATION

 RAS Sacramento REPORT Work Order # S6-07-044

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-13-2 Soil FRACTION 08A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/24/86 FILE # 116080620

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	3300
11104-28-2	PCB-1221	ND	6600
11141-16-5	PCB-1232	ND	6600
53469-21-9	PCB-1242	48000	3300
12672-29-6	PCB-1248	ND	3300
11097-69-1	PCB-1254	ND	6600
11096-82-5	PCB-1260	ND	6600

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
+ = less than 5 times the detection limit.

SAMPLE ID PCB-17-2 Soil SAMPLE # 09 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 60 EX_PCB 07/21/86
% moisture date completed

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-17-2 Soil

FRACTION 09A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY
INSTRMT 1

EXTRCTD 07/24/86
INJECTD 08/06/86

FILE # 116080621

UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	170
11104-28-2	PCB-1221	ND	340
11141-16-5	PCB-1232	ND	340
53469-21-9	PCB-1242	2400	170
12672-29-6	PCB-1248	ND	170
11097-69-1	PCB-1254	ND	340
11096-82-5	PCB-1260	ND	340

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

Received: 07/19/86 Results by Sample

SAMPLE ID PCB-20-1 Soil SAMPLE # 10 FRACTIONS: A
Date & Time Collected 07/16/86 Category

DRY_WT 60 (% moisture) EX_PCB 07/21/86 (date completed)

RADIAN CORPORATION

RAS Sacramento REPORT Work Order # S6-07-044
Received: 07/19/86
Results by Sample

SAMPLE ID PCB-20-1 Soil FRACTION 10A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM
ANALYST RY EXTRCTD 07/24/86 FILE # 116080623
INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	1700
11104-28-2	PCB-1221	ND	3400
11141-16-5	PCB-1232	ND	3400
53469-21-9	PCB-1242	37000	1700
12672-29-6	PCB-1248	ND	1700
11097-69-1	PCB-1254	ND	3400
11096-82-5	PCB-1260	ND	3400

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

RADIAN CORPORATION

Received: 07/19/86

RAS Sacramento REPORT
Results by Sample

Work Order # S6-07-044

SAMPLE ID PCB-2-2 Matrix Spike Soil SAMPLE # 11 FRACTIONS: A
Date & Time Collected 07/16/86 Category ________

EX_PCB________

RADIAN CORPORATION

 RAS Sacramento REPORT Work Order # S6-07-044
Received: 07/19/86 Results by Sample

SAMPLE ID PCB-2-2 Matrix Spike Soil FRACTION 11A TEST CODE 8080PB NAME PCBs in soil
Date & Time Collected 07/16/86 Category ____

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM
ANALYST RY EXTRCTD 07/23/86 FILE # 116080624
INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	2000
11104-28-2	PCB-1221	ND	4000
11141-16-5	PCB-1232	ND	4000
53469-21-9	PCB-1242	13%	2000
12672-29-6	PCB-1248	ND	2000
11097-69-1	PCB-1254	ND	4000
11096-82-5	PCB-1260	ND	4000

NOTES AND DEFINITIONS FOR THIS REPORT.
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- ND = not detected at specified detection limit.
- NA = not analyzed.
- NS = not spiked.
- N\A = not available.
- * = less than 5 times the detection limit.

SAMPLE ID PCB-11-2 Duplicate Analys. SAMPLE # 12 FRACTIONS: A
Date & Time Collected 07/16/86 Category

EX_PCB

RADIAN CORPORATION

RAS Sacramento REPORT

Work Order # S6-07-044

Received: 07/19/86

Results by Sample

SAMPLE ID PCB-11-2 Duplicate Analys. FRACTION 12A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected 07/16/86 Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/23/86 FILE # 116080631

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	820
11104-28-2	PCB-1221	ND	1600
11141-16-5	PCB-1232	ND	1600
53469-21-9	PCB-1242	68000	820
12672-29-6	PCB-1248	ND	820
11097-69-1	PCB-1254	ND	1600
11096-82-5	PCB-1260	ND	1600

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

SAMPLE ID Reagent Blank SAMPLE # 13 FRACTIONS: A
Date & Time Collected not specified Category

EX_PCB

RADIAN CORPORATION

RAS Sacramento REPORT Work Order # S6-07-044

Received: 07/19/86

Results by Sample

SAMPLE ID Reagent Blank FRACTION 13A TEST CODE 8080PB NAME PCBs in soil

Date & Time Collected not specified Category

ORGANICS ANALYSIS DATA SHEET
PESTICIDES

VERIFIED SCM

ANALYST RY EXTRCTD 07/23/86 FILE # 116080626

INSTRMT 1 INJECTD 08/06/86 UNITS ug/kg

CAS #	COMPOUND	RESULT	DET LIMIT
12674-11-2	PCB-1016	ND	17
11104-28-2	PCB-1221	ND	33
11141-16-5	PCB-1232	ND	33
53469-21-9	PCB-1242	ND	17
12672-29-6	PCB-1248	ND	17
11097-69-1	PCB-1254	ND	33
11096-82-5	PCB-1260	ND	33

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NA = not analyzed.
NS = not spiked.
N\A = not available.
* = less than 5 times the detection limit.

Appendix 5

Dike Boring Logs

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF DB-1

Client: FRENCH LTD.
Project Name: French Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-1
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/22/86 Date Completed: 7/22/86
Method: Rotary Wash Total Depth: 64.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
0	TOPSOIL AND CLAYEY SAND, brown and tan, fill(?)	2.0	0-2	ST	.95			<1	
	SILTY SAND TO SAND, fine to coarse grained, brownish tan; below 4.0' wet		2-4	ST	.80				
5	below 6.0' dark gray, discolored, odors detected		4-6	ST	.80				
			6-8	SS	1.8				
			8-10	SS	1.6				
10			10-12	SS	1.3				
	14.0 to 14.6' dark oily discoloration		12-14	SS	1.0				
15			14-16	SS	.60				
			16-18	SS	.70				
			18-20	SS	.60				
20		22.0	20-22	SS	.80				
	SAND, fine to very coarse grained and pebbles (fine gravel), gray		22-24	SS	.40				
25			24-26	SS	.70				
			26-28	SS	.70				
		29.5	28-30	SS	.60				
30	SILTY CLAY, reddish brown and gray, mottled, very firm	32.8	30-32	ST	1.3				
	CLAYEY SILT, with some very fine grained sand, grayish green, firm		32-34	ST	1.45				
35			34-36	ST	1.15				
			36-38	ST	1.2				
			38-40	ST	1.4				
40	40.0 to 43.1' silty very fine grained sand with some clay, grayish green		40-42	ST	1.3				
	43.1 to 46.0' silty clay, grayish green and tan, mottled, firm		42-44	ST	1.5				
45			44-46	SS	1.5				
		48.8	46-48	ST	1.4				
	SILTY CLAY WITH SAND, greenish gray and tan, mottled, very firm		48-50	ST	1.6				
50			50-52	ST	1.4				
		53.5	52-54	ST	1.6				
55	CLAYEY SAND, very fine grained with silt, greenish gray and tan, mottled, very dense		54-56	ST	1.25				
			56-58	ST	1.2				
60	58.0 to 60.0' silty sand, very fine to fine grained, very dense	60.0	58-60	ST	1.3				

(LOG CONTINUED ON PAGE 2 OF 2)

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

RESOURCE ENGINEERING

Sheet 2 of 2

Client FRENCH LTD.
Project Name French Ltd.
Project Location Crosby, Texas
Job No. 275-14 Boring No. DB-1

CONTINUATION OF DB-1

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
60	SILTY CLAY, reddish brown and gray, mottled, massive, very firm		60-62	ST	1.6				
		64.0	62-64	ST	1.5				
65	BORING COMPLETED TO 64.0' DEPTH; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT-BENTONITE GROUT								

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG OF DB-2

Client: FRENCH LTD.
Project Name: French Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-2
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/22/86 Date Completed: 7/22/86
Method: Rotary Wash Total Depth: 52.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (ppm)	OVA (ppm)	SAMPLED FOR CHEMICAL ANALYSIS
0	TOPSOIL AND SILTY CLAY, brown and gray, mottled	2.0	0-2	ST	1.1				
	SAND, medium to very coarse grained, brown, loose, moist		2-4	ST	.9			<1	
	below 4.0' wet								
5			4-6	SS	.7			2	
			6-8	SS	.8			2	
	below 8.0' more grayish color	10.0	8-10	SS	.4			12	
10	SILTY SAND TO SAND, very fine to coarse grained, gray to tan		10-12	SS	1.0			2	
	12.0 to 12.3' with dark gray oily stains		12-14	SS	1.3			50	
	14.0 to 14.2' pebbles (fine gravel)								
15			14-16	SS	1.3			1	
	16.5 to 17.3' some clay lenses with dark oily discoloration		16-18	SS	1.3			3	
			18-20	SS	.75			2	
20			20-22	SS	.7			2	
			22-24	SS	.6			1	
25	24.0 to 26.0' grades to a very coarse sand with some pebbles (fine gravel)		24-26	SS	1.1				
			26-28	SS	.5			1	
	28.0 to 30.0' no recovery; sand or gravel (?)	30.0	28-30	SS	0				
30	SILTY CLAY, reddish brown, firm		30-32	SS	1.7			3	
	below 32.0' with pebbles, well rounded		32-34	SS	.8			2	
35		35.15	34-36	SS	1.4			1	
	SANDY SILT TO SILTY SAND, fine grained, gray and tan to greenish gray and tan, mottled		36-38	ST	1.1			<1	
40		40.0	38-40	ST	1.2			<1	
	SILTY SAND TO SAND, very fine to medium grained, greenish gray and tan, mottled, moderately loose, moist to wet		40-42	ST	1.8			2	
			42-44	ST	1.3			<1	
45			44-46	SS	.8			<1	
		48.0	46-48	ST	1.4			<1	
	SILTY CLAY, reddish brown, very firm		48-50	SS	1.2			<1	
50		52.0	50-52	ST	1.5			<1	
	BORING TERMINATED AT 52.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.								
55									
60									

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG OF DB-3

Client FRENCH LTD.
Project Name French Ltd.
Project Location Crosby, Texas
Job No. 275-14 Boring No. DB-3
Logged By P. Mann, Hydrogeologist
Approved By
Drilled By Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started 7/23/86 Date Completed 7/23/86
Method Rotary Wash Total Depth 50.0'

* OVA was not working properly; HNU unavailable

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (ppm)	OVA (ppm)	SAMPLED FOR CHEMICAL ANALYSIS
0	TOPSOIL AND SILTY CLAY WITH SAND, dark brown and gray and tan, mottled, moderately firm		0-2	ST	1.4		*	*	
			2-4	ST	1.3				
5	SAND, fine to coarse grained, gray, loose, wet	4.9	4-6	ST	1.1				
			6-8	SS	.6				
	8.0 to 10.0' dark discoloration, light odor detected		8-10	SS	.6				
10			10-12	SS	1.2				
			12-14	SS	1.1				
	below 14.0' odors detected		14-16	SS	1.0				
15			16-18	SS	.5				
			18-20	SS	.65				
20			20-22	SS	.9				
	22.0 to 26.0' with pebbles (fine gravel)		22-24	SS	1.5				
25			24-26	SS	1.1				
	28.0 to 28.6' pebbles (fine gravel) underlain by 0.2' of silty clay	28.6	26-28	SS	.6				
	SILTY SAND, very fine grained to sandy silt with some thin clay laminae-greenish gray, soft		28-30	SS	.9				
30			30-32	SS	.8				
			32-34	SS	1.5				
35			34-36	ST	.9				
			36-38	ST	1.2				
	38.0 to 38.55' mottled, greenish gray and tan		38-40	ST	1.3				
40			40-42	SS	.8				
			42-44	SS	.7				
45		46.3	44-46	ST	.45				
	SILTY CLAY, reddish brown, mottled, massive, very firm		46-48	ST	1.3				
		50.0	48-50	ST	1.5				
50	BORING TERMINATED AT 50.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.								
55									
60									

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG OF DB-4

Client: FRENCH LTD.
Project Name: French Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-4
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/23/86 Date Completed: 7/23/86
Method: Rotary Wash Total Depth: 58.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (ppm)	OVA (ppm)	SAMPLED FOR CHEMICAL ANALYSIS
0	TOPSOIL, SANDY CLAY AND SAND (FILL?), dark brown, odor detected		0-2	ST	1.65			2	
		4.0	2-4	ST	1.15			2	
5	SILTY SAND TO SAND, fine to coarse grained, dark brown, discolored, odor detected, moist		4-6	ST	1.1			<1	
		8.0	6-8	SS	.6			<1	
	SILTY CLAY WITH SAND TO SANDY CLAY, oily, discolored, odors detected		8-10	SS	1.5			100	
10		12.0	10-12	SS	1.5			100	
	SILTY SAND TO SAND, fine to coarse grained, gray, wet		12-14	SS	.9			100	
15	below 14.0' fine to very coarse		14-16	SS	.9			50	
			16-18	SS	.8			100	
			18-20	SS	.7			30	
20			20-22	SS	.5			14	
	below 24.0' with pebbles (fine grained)		22-24	SS	.8			46	
25			24-26	SS	.6				
		28.0	26-28	SS	1.0			50	
	SILTY CLAY, reddish brown and gray, mottled, massive, moderately soft to moderately firm		28-30	ST	1.6			10	
30		32.8	30-32	ST	1.3			<1	
	SILTY SAND TO SAND, very fine to fine grained, gray to greenish gray, soft		32-34	ST	1.0			4	
35			34-36	SS	.63			3	
			36-38	ST	1.0			32	
			38-40	ST	1.6			20	
40	40.0 to 46.5' silt to sandy silt, loose to dense		40-42	ST	1.3			2	
			42-44	SS	.4			<1	
45			44-46	SS	0				
	46.5 to 46.9' silty sand, very fine to medium grained		46-48	ST	.9			1	
			48-50	ST	1.65			1	
50	50.4 to 51.4' silty clay or clayey silt		50-52	ST	1.4			<1	
		54.7	52-54	ST	1.1			<1	
55	SILTY CLAY, reddish brown and tan, mottled, very firm		54-56	ST	1.6			<1	
		58.0	56-58	ST	1.7			<1	
60	BORING TERMINATED AT 58.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.								

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

Sheet 1 of 1

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG OF DB-5

Client FRENCH LTD.
Project Name French Ltd.
Project Location Crosby, Texas
Job No. 275-14 Boring No. DB-5
Logged By P. Mann, Hydrogeologist
Approved By
Drilled By Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started 7/24/86 Date Completed 7/25/86
Method Rotary Wash Total Depth 60.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (ppm)	OVA (ppm)	SAMPLED FOR CHEMICAL ANALYSIS
0	SANDY CLAY AND CLAYEY SAND (FILL?), dark gray, odors detected, very stiff		0-2	ST	.8			<1	
	below 4.0' very dark gray, discolored		2-4	ST	.85			2	
5		6.6	4-6	ST	1.1			2	
	SANDY CLAY (FILL?), dark gray	8.7	6-8	ST	1.5			10	
	SAND, fine to coarse grained (fill?), gray to dark gray, discolored, very strong odors detected		8-10	ST	1.5			10	
10			10-12	ST	1.5			300	
		14.0	12-14	ST	1.5			160	
15	SILTY SAND TO SAND, fine to coarse grained, gray, wet		14-16	SS	1.1			60	
			16-18	SS	.8			45	
			18-20	SS	.7			14	
20	20.0 to 20.45' very coarse sand with pebbles (fine gravel)		20-22	SS	.75			40	
	22.0 to 24.0' very coarse sand with pebbles		22-24	SS	1.0			20	
25	Note: Upon reaching 26.0' depth, a cable on the rig broke. Returned to operation on 7/25/86 at which time the 24-26 was resampled (?). At 38-40 depth interval it was determined that the intervals were miscounted		24-26	SS	.5			34	
		28.0	26-28	SS	1.4			10	
	SILTY CLAY, reddish brown and tan, mottled, massive, moderately firm to firm	*	28-30	SS	1.2			20	
30	* These are the correct intervals from which these samples were collected for chemical analysis. Prior to correction, these intervals were identified as being 26-28 and 32-34 because of a logging error		30-32	ST	1.9			<1	
			32-34	ST	1.3			<1	
35		*	34-36	ST	1.8			<1	
			36-38	ST	1.3			<1	
		40.0	38-40	ST	1.7			<1	
40	SANDY SILT TO SILTY SAND, fine grained, greenish gray, dense		40-42	SS	.8			<1	
			42-44	SS	1.0			<1	
45			44-46	SS	.7			<1	
	below 46.0' clayey silt with some fine grained sand		46-48	SS	.35			2	
			48-50	ST	1.35			<1	
50			50-52	ST	1.65			<1	
			52-54	ST	1.5			<1	
55	below 55.6' silty sand	56.0	54-56	ST	1.8			<1	
	SILTY CLAY, reddish brown and tan, mottled, massive, very firm		56-58	ST	1.5			<1	
60	BORING TERMINATED AT 60.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.	60.0	58-60	ST	1.8			2	

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG OF DB-6

Client FRENCH LTD.
Project Name French Ltd.
Project Location Crosby, Texas
Job No. 275-14 Boring No. DB-6
Logged By P. Mann, Hydrogeologist
Approved By
Drilled By Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started 7/24/86 Date Completed 7/24/86
Method Rotary Wash Total Depth 54.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (ppm)	OVA (ppm)	SAMPLED FOR CHEMICAL ANALYSIS
0	SANDY CLAY TO SILTY CLAY (FILL?), brown, very firm		0-2	ST	.7				
			2-4	ST	1.2		1.4		
5			4-6	ST	1.0		4		
		8.0	6-8	ST	1.6		4.4		
	CLAYEY SAND, SANDY CLAY (FILL?), dark gray to black, discolored odors detected		8-10	ST	1.5		5		
10	10.0 to 12.0' well compacted; chemically cemented		10-12	ST	1.4		1		
	14.0 to 15.0' oily discoloration	14.0	12-14	ST	1.2		2		
15	SAND, medium to coarse grained, gray, wet		14-16	SS	1.0		4		
			16-18	SS	.6		5		
20	20.0 to 20.2' very coarse sand with pebbles (fine gravel)		18-20	SS	.6				
			20-22	SS	1.2		10		
			22-24	SS	.35		10		
25	below 24.0' very coarse sand with pebbles (fine gravel)		24-26	SS	1.4		2.4		
		28.0	26-28	SS	.7		<1		
30	SILTY CLAY, reddish brown and tan, mottled, massive, moderately firm to firm		28-30	SS	1.0		1		
	31.0 to 33.0' with some fine grained sand		30-32	ST	1.85		5		
			32-34	ST	1.3		1		
35			34-36	ST	.5		<1		
		37.0	36-38	ST	.7		<1		
	SILTY SAND TO SAND, very fine grained, greenish gray to gray and tan, mottled, loose to dense		38-40	ST	1.0		1		
40	40.0 to 41.7' clayey silt, greenish gray and tan		40-42	SS	1.7		<1		
			42-44	ST	.95		<1		
45			44-46	SS	1.4		<1		
			46-48	SS	.6		<1		
		50.0	48-50	SS	.7		4		
50	SILTY CLAY, reddish brown and tan, mottled, very firm, with slickensides		50-52	ST	1.2		2.6		
		54.0	52-54	ST	1.4		<1		
55	BORING TERMINATED AT 54.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.								
60									

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF DB-7

Client: FRENCH, LTD.
Project Name: French, Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-7
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/18/86 Date Completed: 7/19/86
Method: Rotary Wash Total Depth: 58.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
0	SILTY SAND (FILL?), gray and black; odor detected	2.0	0-2	ST	1.0'		50		
	SILTY CLAY, gray, massive, moderately firm		2-4	SS	1.0'		<1		
5			4-6	ST	1.8'		<1		
			6-8	ST	1.9'		1.0		
10		10.4	8-10	SS	0.3'		<1		
	SILTY SAND, ranging from fine to coarse grained, gray, poorly sorted, graded		10-12	SS	1.4'		<1		
	saturated below 12.0'		12-14	SS	1.7'			1.0	
15			14-16	SS	0.7'		1	6	
			16-18	SS	1.1'		<1	80	
20	18.0' to 22.0' very dark gray, discolored silty sand		18-20	SS	1.3'			100	
			20-22	SS	1.1'		2	200	
			22-24	SS	1.0'			10	
25	24.5' with pebble sized gravel	26.3	24-26	SS	1.0'		3		
	SILTY CLAY, reddish brown and gray, mottled, massive, very firm		26-28	ST	1.5'		3		
30			28-30	ST	1.9'		<1		
			30-32	ST	1.8'		<1		
			32-34	ST	1.7'		<1		
35	below 35.6' increasingly sandy, fine grained with grennish gray color		34-36	ST	1.6'		<1		
		38.0	36-38	ST	1.8'		<1		
	CLAYEY SAND WITH SILT, very fine grained, greenish gray, moist		38-40	ST	1.5'		<1		
40		41.0	40-42	SS	1.2'		<1	2	
	SILTY TO SANDY CLAY, gray, brown and reddish brown, mottled, massive, very firm		42-44	ST	1.35'		<1	2	
45		46.0	44-46	ST	1.2'		<1		
	CLAYEY SAND, very fine to fine grained, gray and brown, mottled, dense, moist		46-48	ST	1.7'			<1	
			48-50	ST	1.6'			<1	
50	below 52.0' reddish brown color observed		50-52	ST	1.5'			<1	
		53.0	52-54	ST	1.65'			<1	
	CLAY TO SILTY CLAY, reddish brown and gray, mottled, massive, very firm		54-56	ST	1.5'			<1	
55		58.0	56-58	ST	1.65'			<1	
60	BORING COMPLETED AT 58.0 FEET; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT.								

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF DB-8

Client: FRENCH, LTD.
Project Name: French, Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-8
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/20/86 Date Completed: 7/20/86
Method: Rotary Wash Total Depth: 56.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
0	SILTY CLAY, brown and black, discolored, oily		0-2	ST	0.9				
		4.0	2-4	ST	1.6				
5	SAND, fine to medium grained, dark gray to gray, wet		4-6	SS	0.7				
			6-8	SS	0.6				
			8-10	SS	0.5				
10			10-12	SS	1.1				
	12.6 to 13.5' coarse to very coarse sand with some pebbles		12-14	SS	1.5				
15			14-16	SS	1.1				
	18.0 to 18.4' sandy silt, gray		16-18	SS	0.5				
20	below 20.0' fine to coarse sand, dark gray color, odor detected		18-20	SS	1.2				
			20-22	SS	0.9				
			22-24	SS	1.2				
25		26.35	24-26	SS	1.3				
	SILTY CLAY, reddish brown and gray, mottled, very firm		26-28	ST	1.1			4	
			28-30	ST	1.65			<1	
30			30-32	ST	1.0				
		34.0	32-34	ST	0.85			<1	
35	CLAY, SILT AND VERY FINE GRAINED SAND, reddish brown and gray, mottled, gray and tan below 36.0'		34-36	SS	0.6				
			36-38	SS	1.2				
			38-40	ST	1.3				
40	40.8 to 41.35' clayey silt, gray and tan, mottled		40-42	ST	1.35				
			42-44	SS	1.4				
45			44-46	SS	1.2				
		48.2	46-48	ST	1.6				
	SILTY CLAY, reddish brown and gray, mottled, massive, very firm		48-50	ST	1.85				
50			50-52	ST	1.2				
			52-54	ST	1.6				
55		56.0	54-56	ST	1.3				
	BORING COMPLETED TO 56.0' DEPTH; THEN SEALED WITH CEMENT-BENTONITE GROUT								
60									

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF DB-9

Client: FRENCH, LTD.
Project Name: French, Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-9
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/21/86 Date Completed: 7/21/86
Method: Rotary Wash Total Depth: 56.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
0	TOPSOIL AND SILTY SAND, reddish brown to dark gray, fill(?)	2.0	0-2	ST	1.25			2	
	CLAYEY SAND, dark gray, discolored, fill(?)	4.0	2-4	ST	1.3			2	
5	SAND, fine to coarse grained, gray, wet		4-6	SS	.75			<1	
			6-8	SS	.70			<1	
			8-10	SS	1.40			<1	
10			10-12	SS	.90				
			12-14	SS	.75			30	
15			14-16	SS	.75			16	
			16-18	SS	.65			30	
	18.0 to 20.0' with pebbles		18-20	SS	.75				
20	20.0 to 22.0' odor detected; put on respirator		20-22	SS	.5				
	22.0 to 26.0' with pebbles		22-24	SS	.65				
25			24-26	SS	1.0			3	
	26.0 to 28.0' coarse to very coarse gray sand	28.0	26-28	SS	.80				
	PEBBLES (FINE GRAVEL) WITH SOME SAND		28-30	SS	.50				
30		32.4	30-32	SS	.80				
	SILTY SAND, fine grained, with clay, grayish green to greenish gray, dense		32-34	SS	1.25			2	
35			34-36	SS	.50			25	
			36-38	SS	1.0			26	
			38-40	SS	.85			10	
40			40-42	SS	.80			30	
			42-44	SS	.85			35	
45			44-46	SS	.30			<1	
	-below 46.0' dark brown oily color	48.0	46-48	SS	.9			1000	
	SILTY CLAY, reddish brown and gray, mottled, massive, very firm		48-50	SS	1.5			40	
50			50-52	ST	1.45			<1	
			52-54	ST	1.55			<1	
55		56.0	54-56	ST	.90			<1	
	BORING COMPLETED TO 56.0' DEPTH; THEN SEALED WITH CEMENT BENTONITE GROUT								
60									

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

Sheet 1 of 1

LITHOLOGIC LOG AND CONSTRUCTION OF DB-10

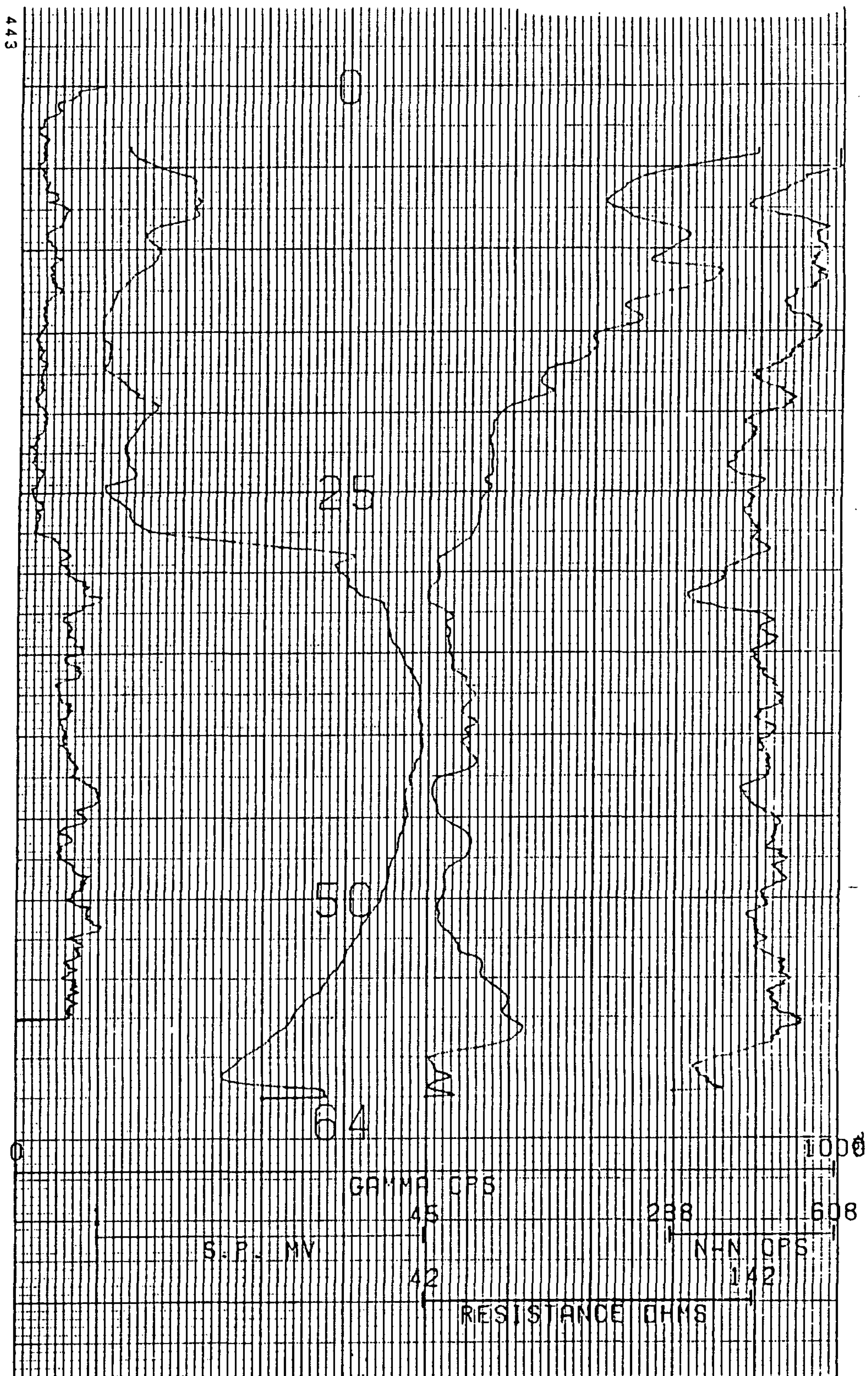
Client: FRENCH LTD.
Project Name: French Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: DB-10
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Gulf Coast Coring - Rosenburg, Texas

DRILLING AND SAMPLING INFORMATION
Date Started: 7/21/86 Date Completed: 7/21/86
Method: Rotary Wash Total Depth: 58.0'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	RECOVERY	GRAPHIC LOG	HNU (IN ppm)	OVA (IN ppm)	SAMPLED FOR CHEM. ANALYSIS
0	CLAYEY SILT AND SAND, dark gray and brown		0-2	ST	1.3				
	SAND, FINE TO COARSE GRAINED, dark gray, discolored, moist		2-4	ST	1.0			<1	
5			4-6	SS	1.2			<1	
	below 8.0' wet		6-8	SS	None				
10	10.0 to 16.0' strong odor detected		8-10	SS	.6			<1	
			10-12	SS	.6			4	
			12-14	SS	.8			<1	
15	below 16.0' grayish green color		14-16	SS	1.2			<1	
	18.0' some clay and silt lenses		16-18	SS	.9			<1	
20			18-20	SS	.6			<1	
	below 22.0' some very coarse sand, dark gray oily discoloration		20-22	SS	.4			9	
		24.0	22-24	SS	.5			20	
25	SAND AND PEBBLES (fine gravel)		24-26	SS	.6			6	
		28.0	26-28	SS	.4			1	
30	SILTY CLAY, reddish brown, massive, firm SILTY SAND, very fine to fine grained, gray and tan	28.6	28-30	SS	1.2			1	
			30-32	SS	.8			10	
	34.0 to 36.0' dense very fine grained sand, tan		32-34	SS	.4			16	
35			34-36	SS	1.3			3	
			36-38	SS	.5			1	
			38-40	SS	.6			<1	
40		42.1	40-42	SS	1.5			<1	
	SILTY CLAY, gray and tan, massive, very firm 44.0 to 44.5' clayey silt		42-44	ST	1.6				
45			44-46	SS	1.2			<1	
			46-48	ST	1.5			<1	
			48-50	ST	1.5			<1	
50	CLAYEY SAND, fine grained, reddish brown and gray, mottled below 53.1' medium to coarse grained sand, brownish tan		50-52	ST	1.5			<1	
		54.0	52-54	ST	1.4			<1	
55	SILTY CLAY, reddish brown and gray, mottled, firm		54-56	ST	1.6			<1	
		58.0	56-58	ST	1.4			<1	
60	BORING COMPLETED TO 58.0' DEPTH; BOREHOLE WAS GEOPHYSICALLY LOGGED, THEN SEALED WITH CEMENT BENTONITE GROUT								

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

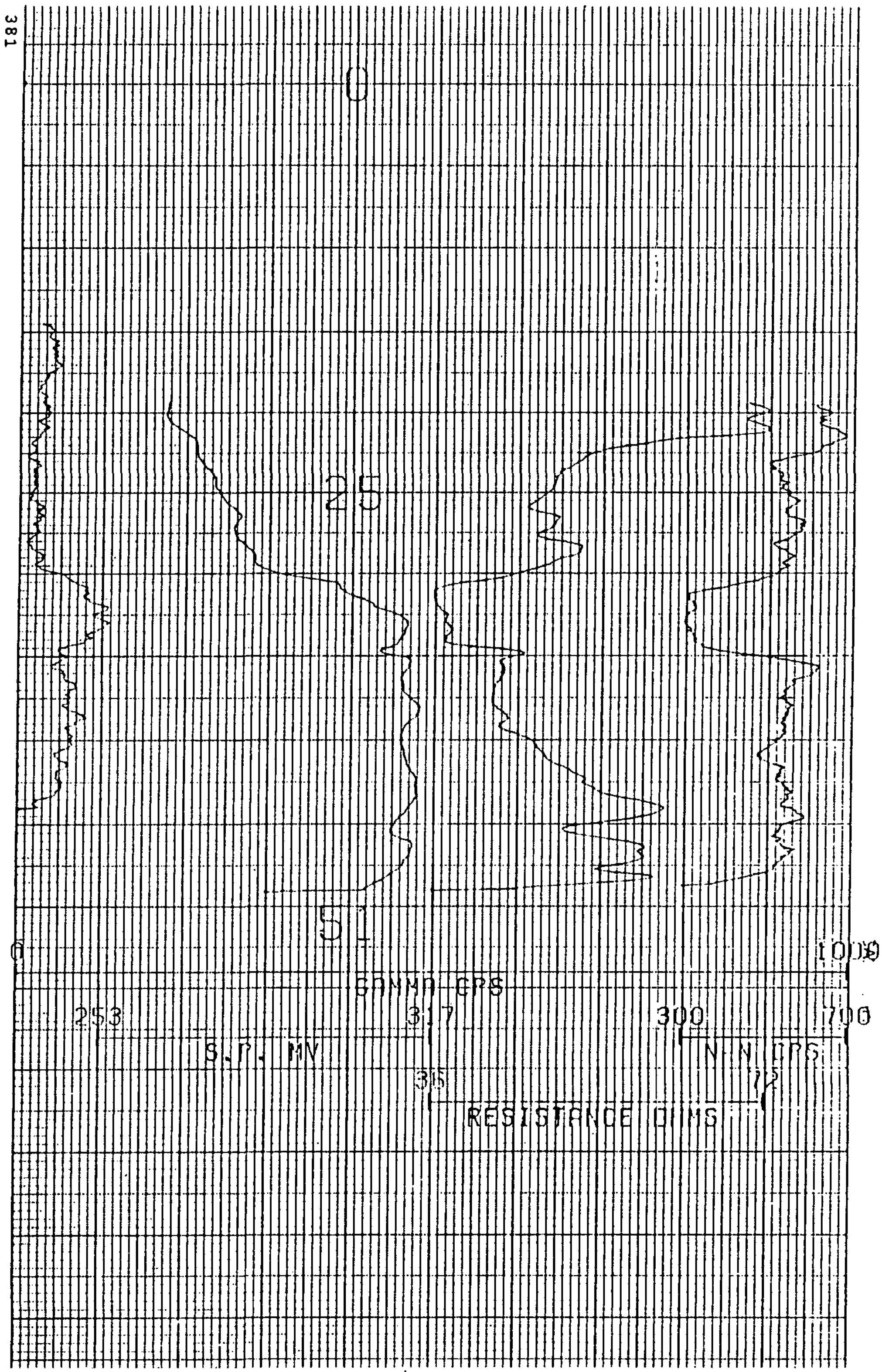
BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING



RESOURCE ENGINEERING INC.
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG
DB-1
FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



RESOURCE ENGINEERING INC.

ENVIRONMENTAL CONSULTANTS

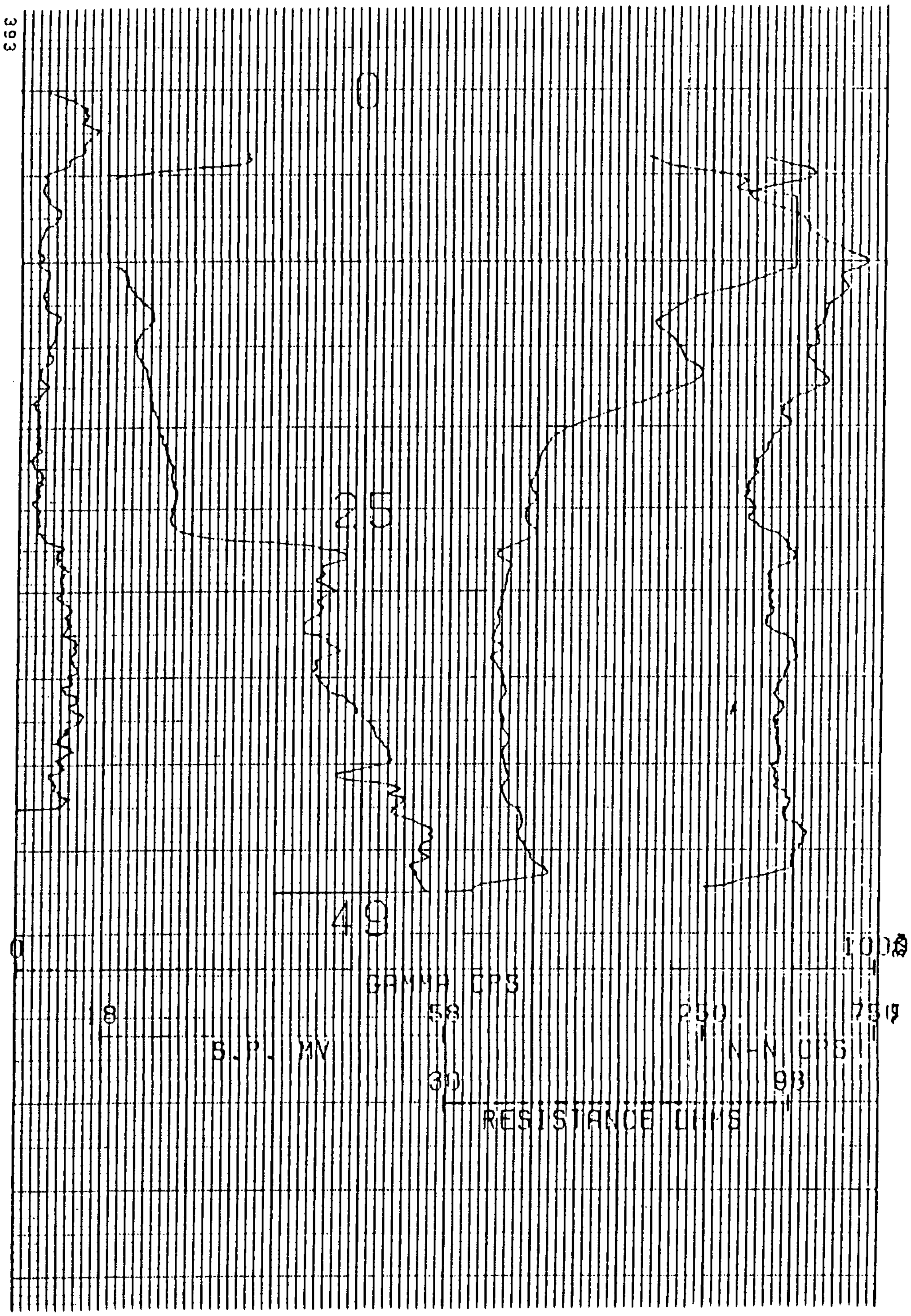
HOUSTON, TEXAS

GEOPHYSICAL LOG

DB-2

FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



RESOURCE ENGINEERING INC.

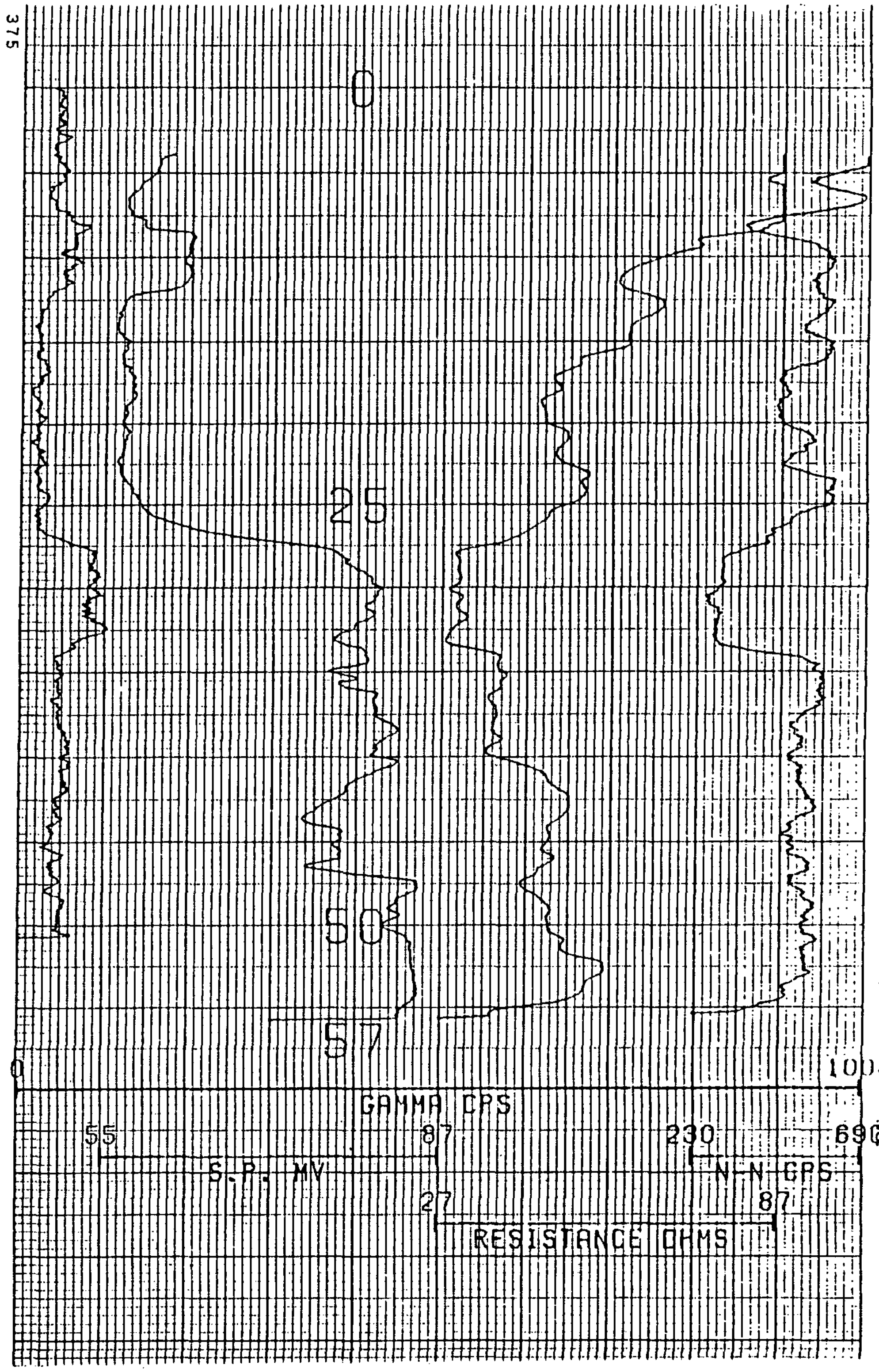
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG

DB-3

FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



RESOURCE ENGINEERING INC.

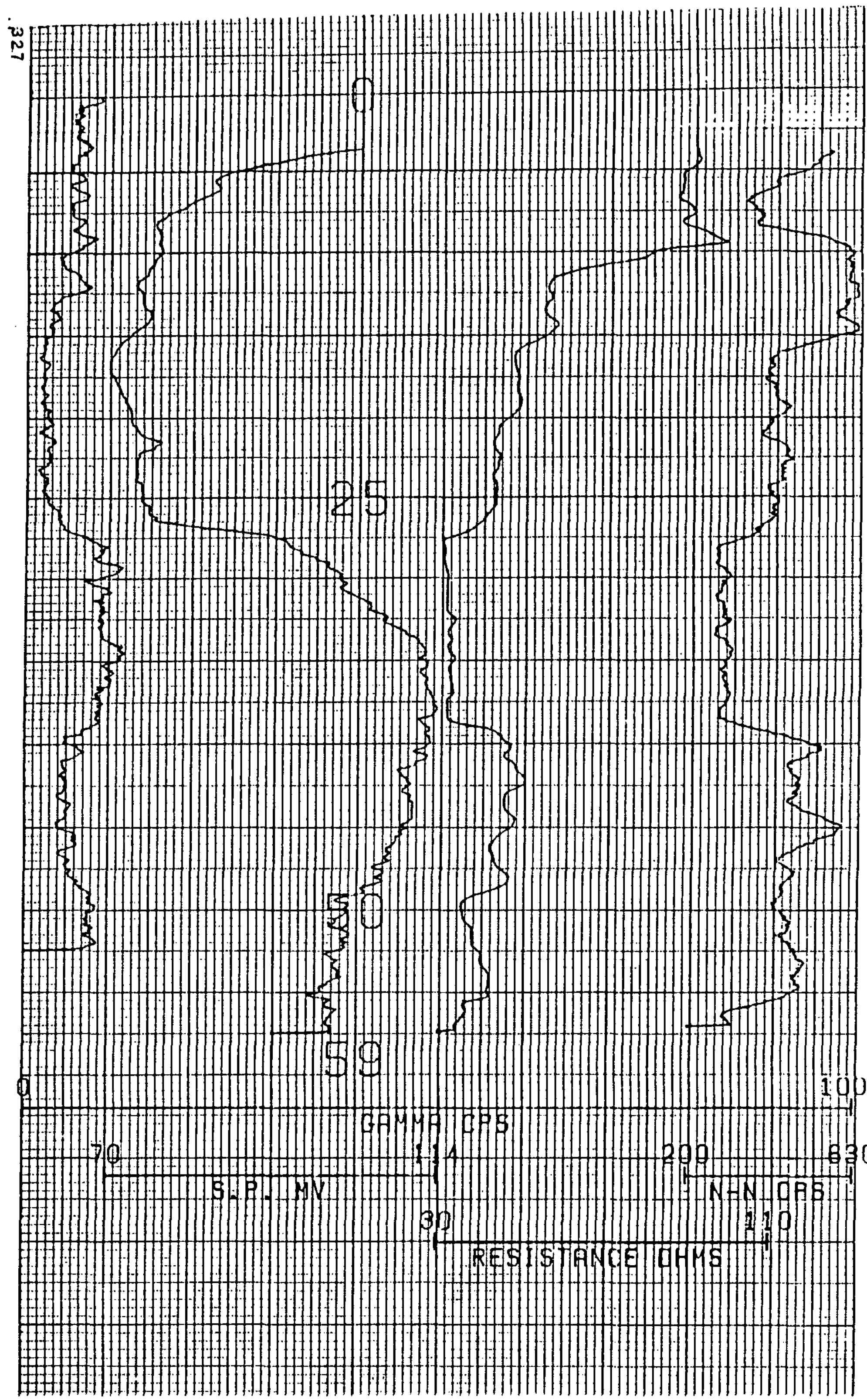
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG

DB-4

FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



RESOURCE ENGINEERING INC.

ENVIRONMENTAL CONSULTANTS

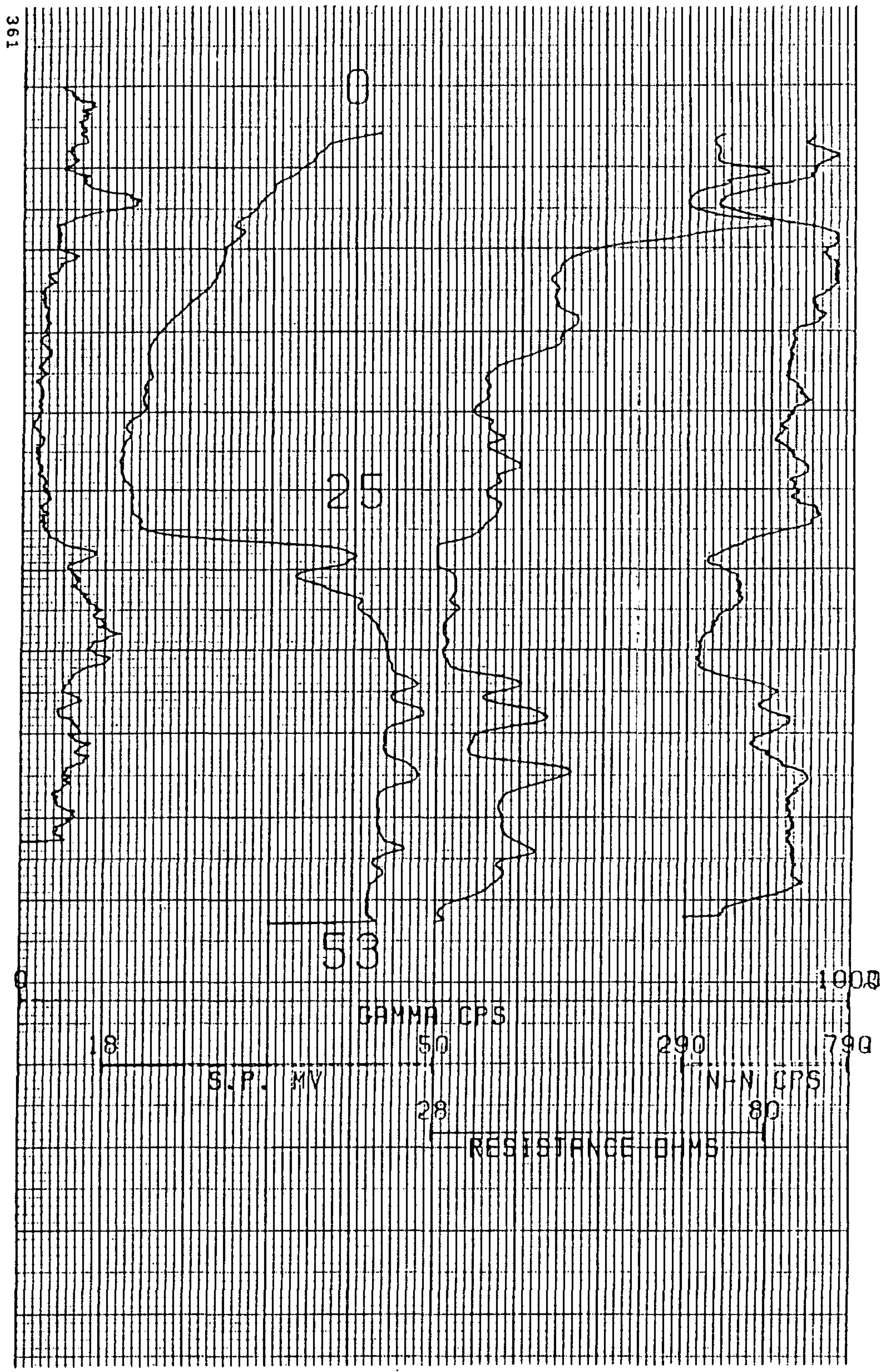
HOUSTON, TEXAS

GEOPHYSICAL LOG

DB-5

FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



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GEOPHYSICAL LOG

DB-6

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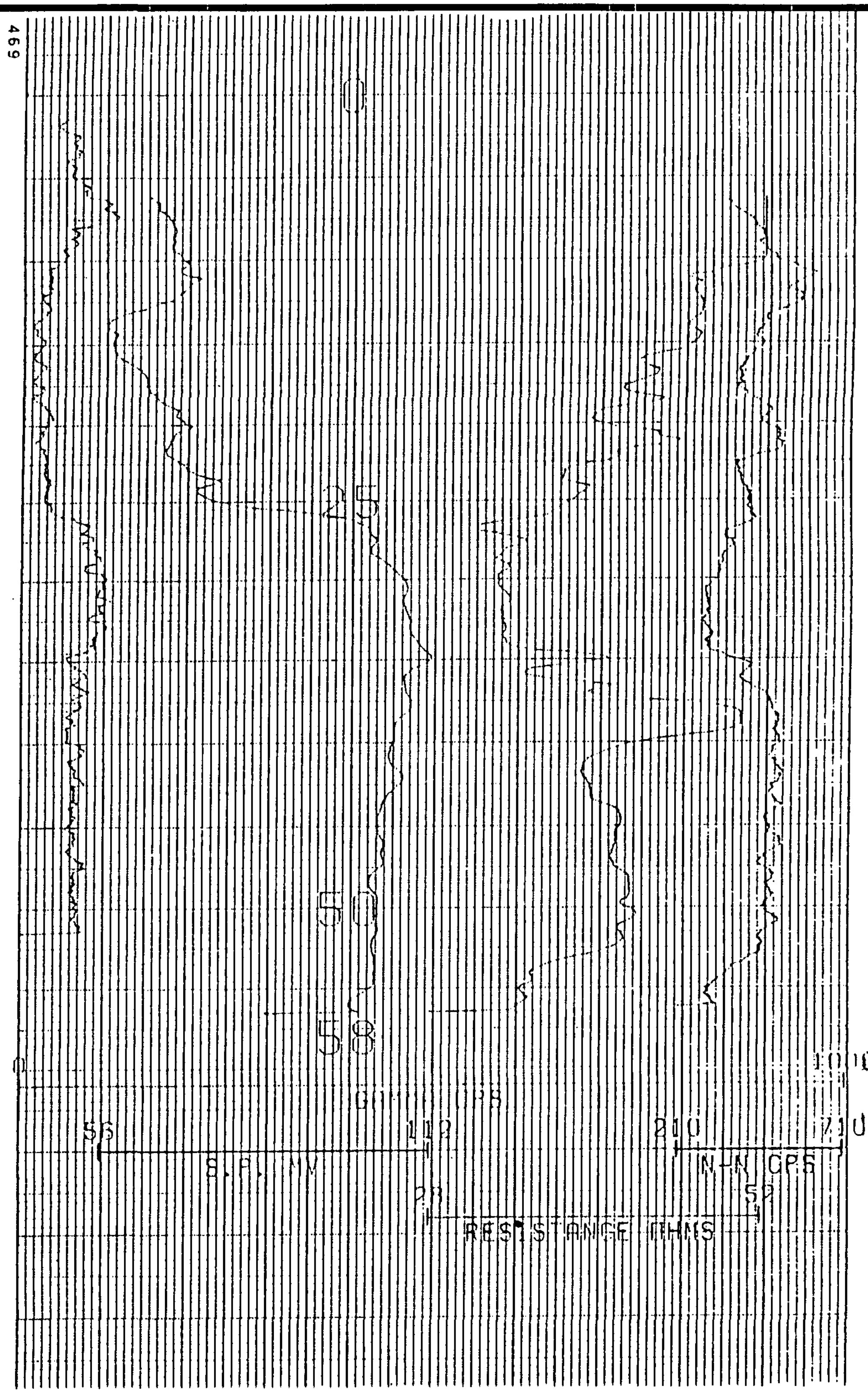
DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14

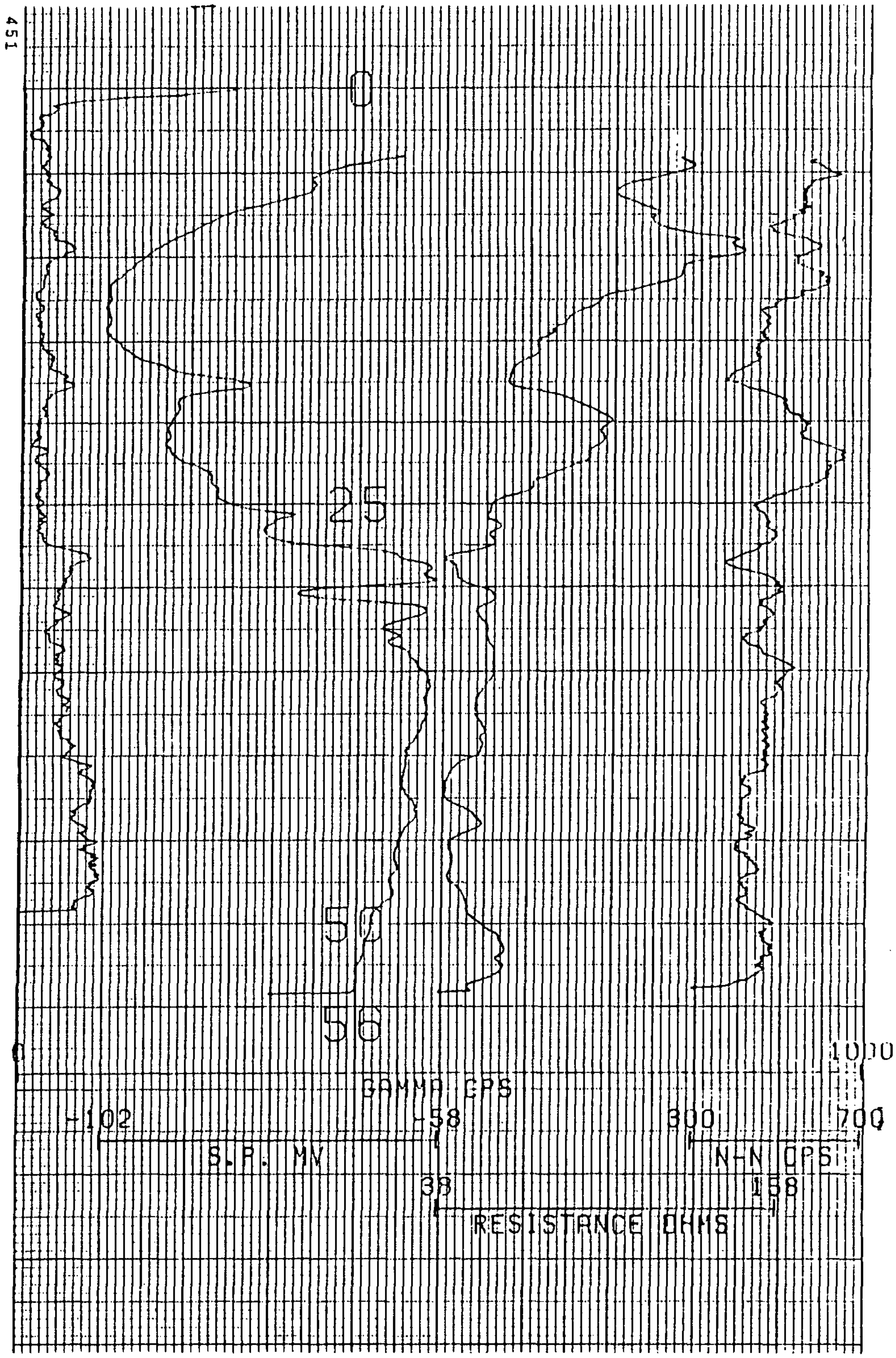


RESOURCE ENGINEERING INC.

ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG
DB-7
FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



RESOURCE ENGINEERING INC.

ENVIRONMENTAL CONSULTANTS

HOUSTON, TEXAS

GEOPHYSICAL LOG

DB-10

FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14

Appendix 6

Dike Soil PNA Analytical Reports

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0158	RESOURCE ENGINEERING	RES27514	SDB-1-30-32	860722	0130	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[a]	QC Replicate: Second ug/kg[a]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	72	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	72	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7[a]
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	95	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	380	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	ND	380	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	72	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	380	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	72	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	95	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	380	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	72	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	72	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	630	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	380	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	380	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	380	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	72	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	380	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	380	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	84	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	72	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0158	RESOURCE ENGINEERING	RES27514	SDB-1-30-32	860722	0130	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	72	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	34	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	380	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	61	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	84	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	61	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	72	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	380	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	380	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	72	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	72	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	72	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0158	RESOURCE ENGINEERING	RES27514	SDB-1-30-32	86072	0130	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	87	23	120
2-Fluorobiphenyl	50	83	30	115
Terphenyl-D14	50	113	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

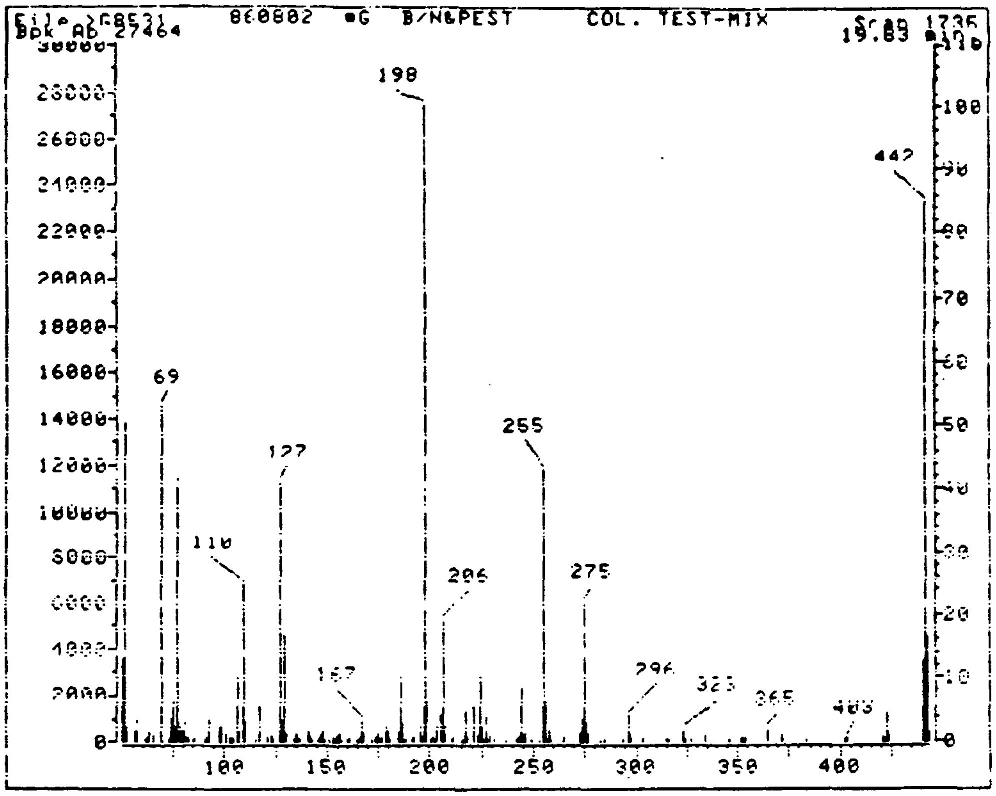


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slaughnuch
Injection Time: 15:34 Processor: Tom Lusowitz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

KB 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0156	RESOURCE ENGINEERING	RES27514	SDB-1-34-36	860722	0135	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[a]	Second ug/kg[a]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	75	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	75	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7[a]
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	99	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	839	400	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	75	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	75	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	99	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	650	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	400	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	75	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	400	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	75	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0156	RESOURCE ENGINEERING	RES27514	SDB-1-34-36	860722	0135	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	63	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	63	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	75	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	75	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	75	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0156	RESOURCE ENGINEERING	RES27514	SDB-1-34-36	86072	0135	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	98	23	120
2-Fluorobiphenyl	50	79	30	115
Terphenyl-D14	50	104	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* [illegible] EPA Control Limits

** Advisory Limits Only

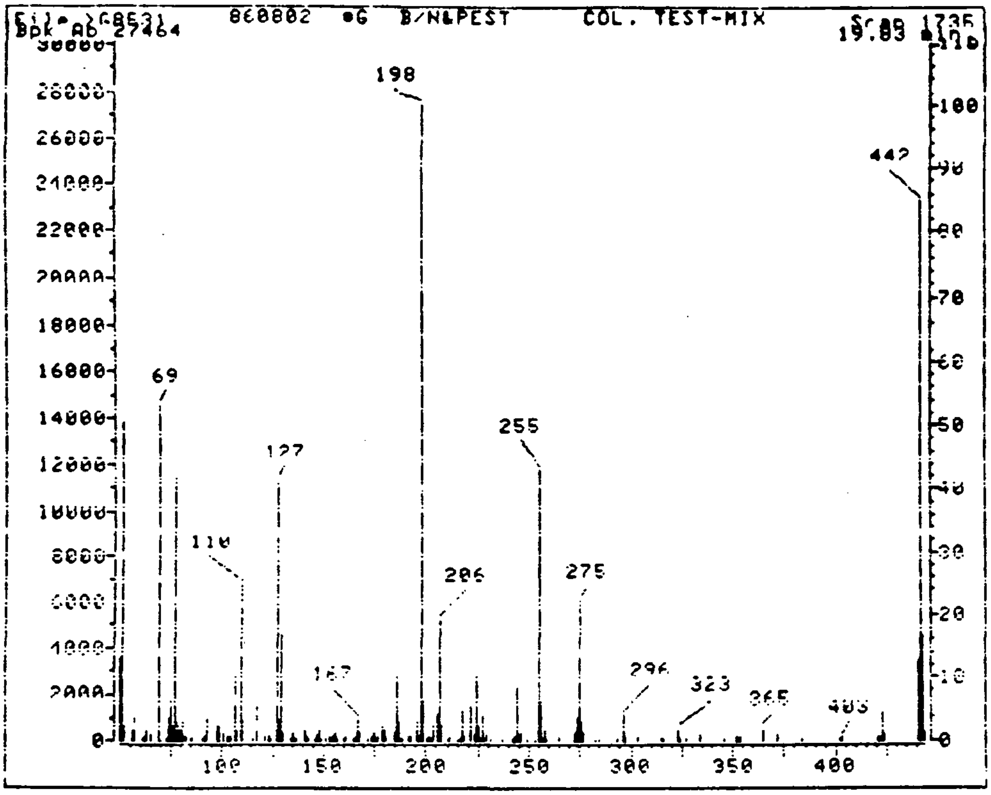


TABLE 2: METHOD PERFORMANCE DATA (OR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [signature]
Injection Time: 15:34 Processor: Tom [signature]
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

KB 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0160	RESOURCE ENGINEERING	RES27514	SDB-1-42-44	860722	0230	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3290	0[a]
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	BMDL	320	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	320	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3290	98

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0160	RESOURCE ENGINEERING	RES27514	SDB-1-42-44	860722	0230	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3290	90
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3290	111
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	93

* Recovery normally variable using established methodology.

AUG 1, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0160	RESOURCE ENGINEERING	RES27514				0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	84	20	140
2-Fluorobiphenyl	50	86	20	140
Terphenyl-D14	50	100	20	150

* IFB EPA Control Limits

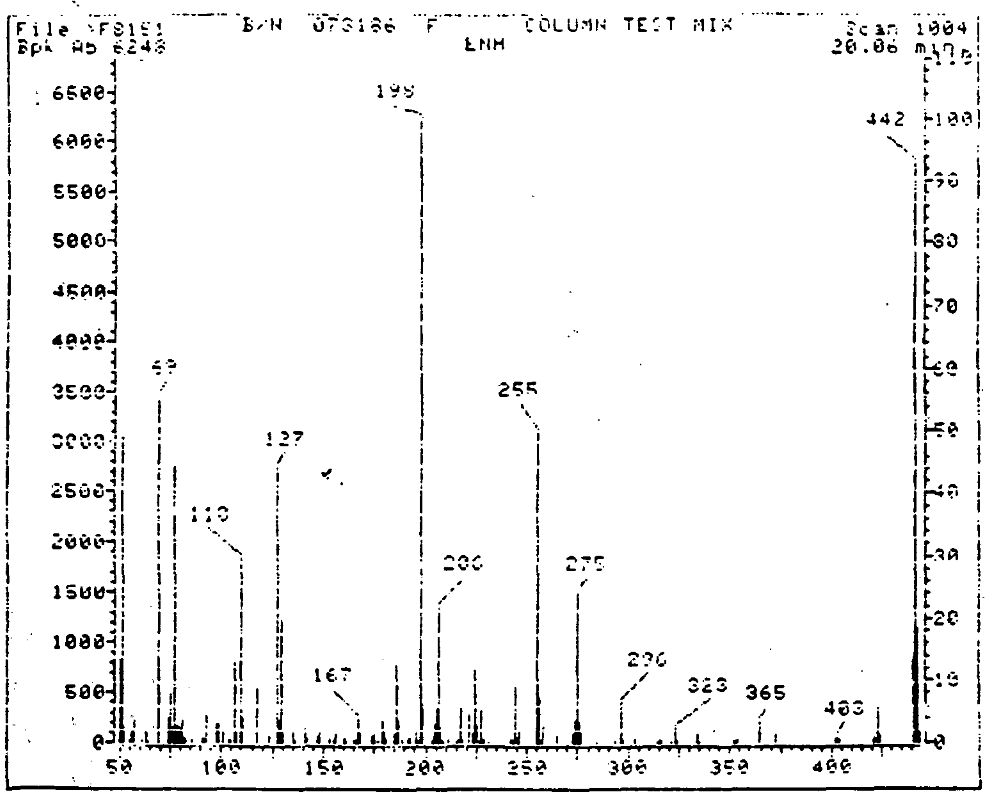


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	48.74	48.74	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	55.39	55.39	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	43.99	43.99	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.27	6.27	Ok
275	10-30% of mass 198	24.06	24.06	Ok
365	Greater than 1% of mass 198	3.36	3.36	Ok
441	0-100% of mass 443	13.63	74.94	Ok
442	Greater than 40% of mass 198	92.74	92.74	Ok
443	17-23% of mass 442	18.19	19.61	Ok

Injection Date: 07/31/86
Injection Time: 12:04
Run No: >F8151
Spectrun No: 1004

Analyst: [signature]
Processor: Mita Mukherjee
QC Batch: QB5385
Samples: Calib. Std. ~~N0159~~ MM
N0159, N0160, N0167, N016
N0170, N0171, N1242

B 8/1/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8. 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0157	RESOURCE ENGINEERING	RES27514	SDB-1-46-48	860722	0240	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[a]	Second ug/kg[a]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	75	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	75	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7[a]
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	99	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B'	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	634	400	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	75	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	75	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	99	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	650	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	ND	400	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	75	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	400	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	75	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0157	RESOURCE ENGINEERING	RES27514	SDB-1-46-48	860722	0240	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg@	QC Replicate: Second ug/kg@	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	63	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	63	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	75	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	75	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	75	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	87

@ Results variable due to Non-Homogenous sample matrix.

@ Recovery normally variable using established methodology.

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0157	RESOURCE ENGINEERING	RES27514	SDB-1-46-48	86072	0240	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	93	23	120
2-Fluorobiphenyl	50	78	30	115
Terphenyl-D14	50	93	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

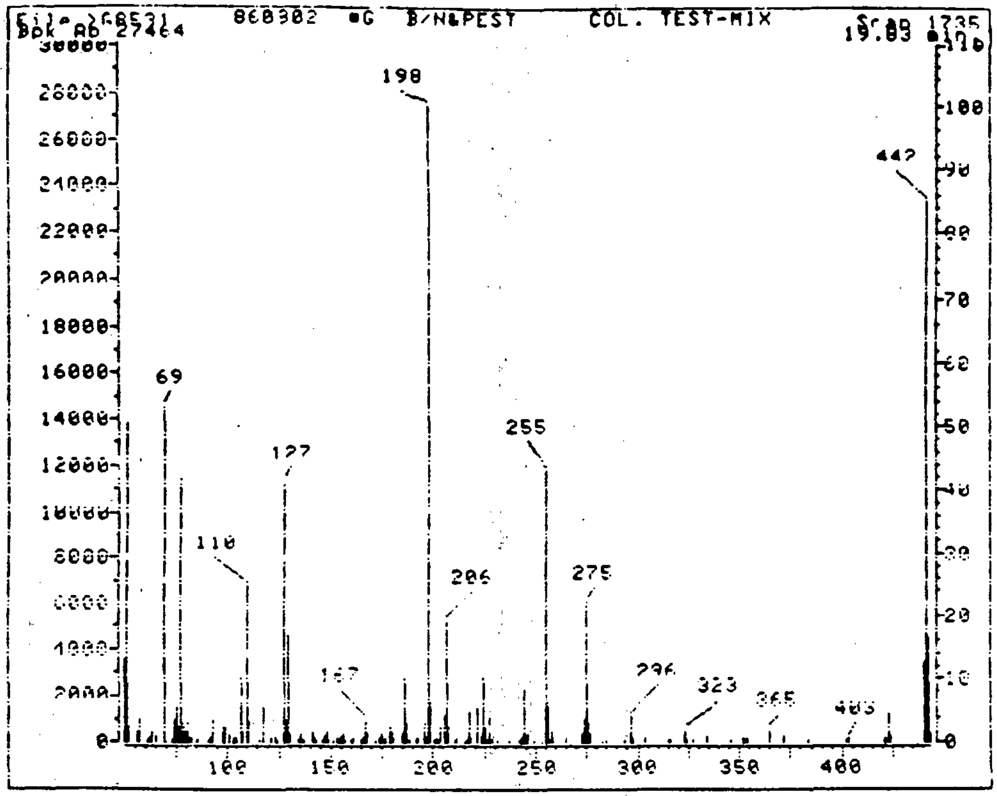


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slappnuch
Injection Time: 15:34 Processor: Tom Lusowitz
Run No: >68531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0155	RESOURCE ENGINEERING	RES27514	SDB-1-58-60	860722	0310	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	76	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	76	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	99	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	400	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	76	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	76	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	99	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	660	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	400	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	76	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	400	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	76	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0155	RESOURCE ENGINEERING	RES27514	SDB-1-58-60	860722	0310	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg*	Second ug/kg*	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	64	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	64	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	76	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	76	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	76	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	87

* Results variable due to Non-Homogenous sample matrix.

* Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0155	RESOURCE ENGINEERING	RES27514	SDB-1-58-60	86072	0310	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	95	23	120
2-Fluorobiphenyl	50	92	30	115
Terphenyl-D14	50	96	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

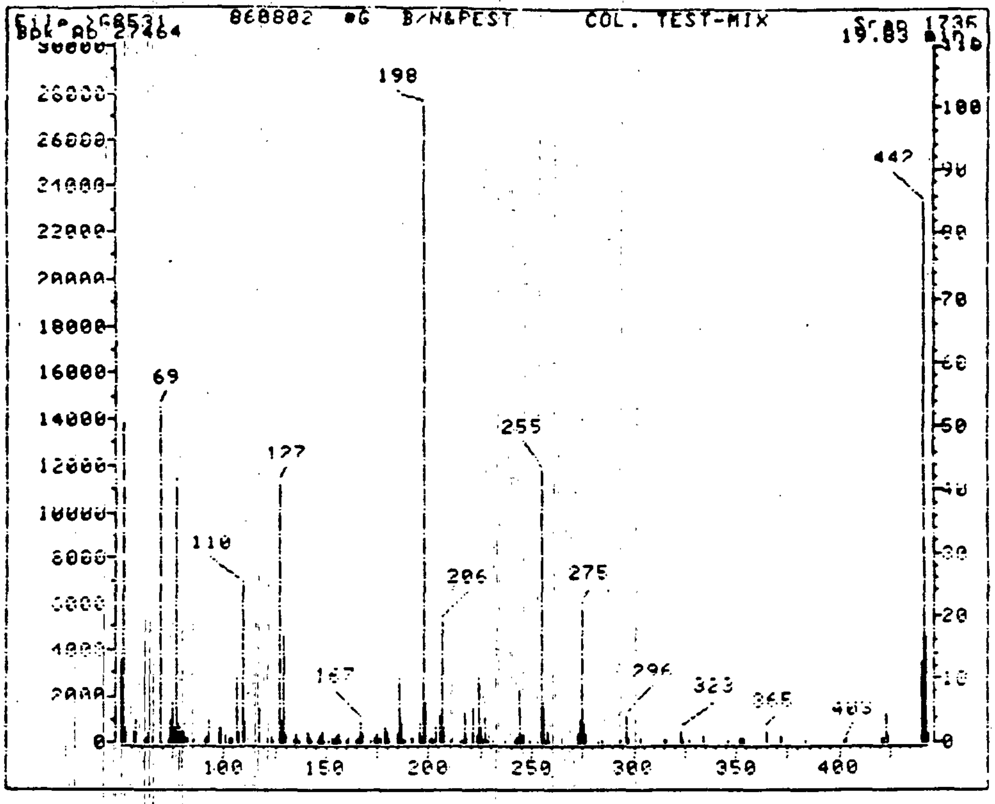


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 196	50.45	50.45	Uk
68	Less than 2% of mass 69	0.00	0.00	Uk
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Uk
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Uk
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Uk
365	Greater than 1% of mass 198	2.02	2.02	Uk
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Uk
443	1 7-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slapgrack

Injection Time: 15:34 Processor: Tom Kusowicz

Run No: >G8531 QC Batch: QB5395

Spectrun No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

KB 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0159	RESOURCE ENGINEERING	RES27514	SDB-1-62-64	860722	0325	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3290	0[a]
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	ND	330	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	330	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	72	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3290	98

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0159	RESOURCE ENGINEERING	RES27514	SDB-1-62-64	860722	0325	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3290	90
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3290	111
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	93

@ Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

August 5, 1986

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery Soil- GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0159						

Compound	Amount Added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	86	20	140
2-Fluorobiphenyl	50	97	20	140
Terphenyl-D14	50	96	20	150

* IFB EPA Control Limits.

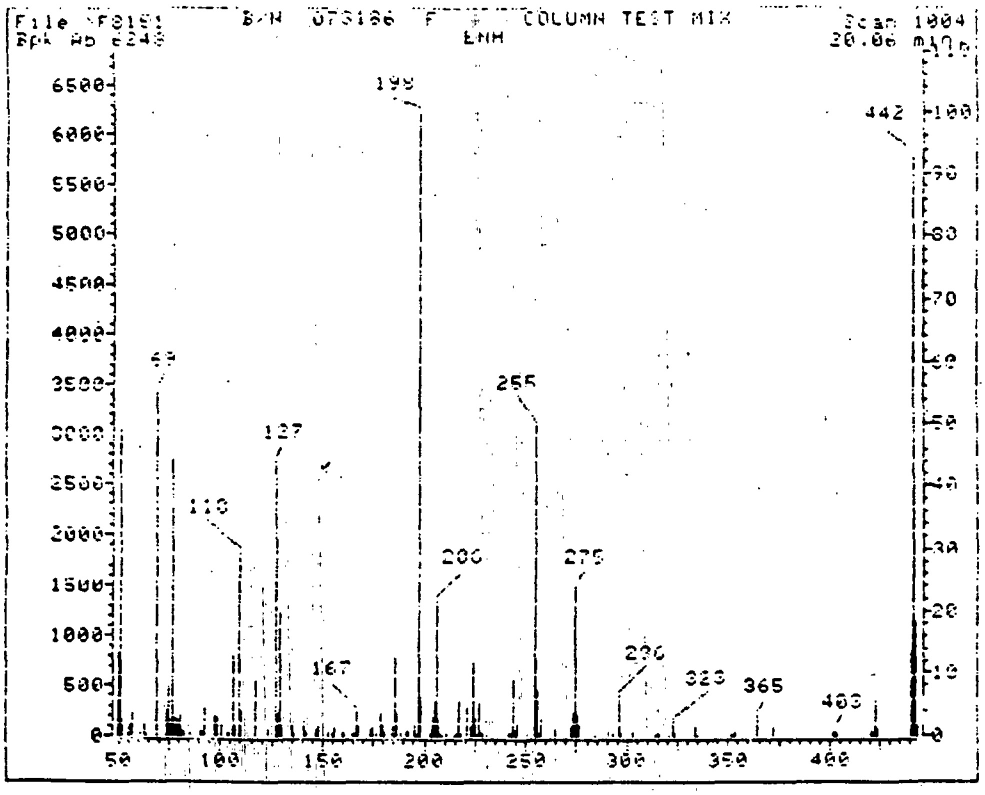


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	48.74	48.74	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	55.39	55.39	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	43.99	43.99	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.27	6.27	Ok
275	10-30% of mass 198	24.06	24.06	Ok
365	Greater than 1% of mass 198	3.36	3.36	Ok
441	0-100% of mass 443	13.63	74.94	Ok
442	Greater than 40% of mass 198	92.74	92.74	Ok
443	17-23% of mass 442	18.19	19.61	Ok

Injection Date: 07/31/86 Analyst: [illegible]
Injection Time: 12:04 Processor: [illegible]
Run No: >F8151 QC Batch: QB5385
Spectrun No: 1004 Samples: Calib. Stds, ~~N0159~~ MM
N0159, N0160, N0167, N016[illegible]
N0170, N0171, N1242

KB 8/1/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0149	RESOURCE ENGINEERING	RES27514	SDB-2-30-32	860722	2045	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	100	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	190	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	100	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	2400	ND	ND	ND	0	-	ND	4040	7[illegible]
5B	Benzo(a)anthracene	ND	420	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	130	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	540	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	220	ND	ND	ND	0	-	ND	0	-
9B'	*Benzo(k)fluoranthene*	ND	190	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	280	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	310	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	310	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	540	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	100	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	540	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	100	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	230	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	130	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	540	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	100	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	100	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	240	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	890	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	540	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	540	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	540	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	310	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	100	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	540	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	540	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	120	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	100	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0149	RESOURCE ENGINEERING	RES27514	SDB-2-30-32	860722	2045	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	100	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	48	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	540	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	86	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	250	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	120	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	BMDL	86	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	100	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	540	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	540	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	100	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	290	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	100	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	100	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0149	RESOURCE ENGINEERING	RES27514	SDB-2-30-32	86072	2045	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	105	23	120
2-Fluorobiphenyl	50	94	30	115
Terphenyl-D14	50	97	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

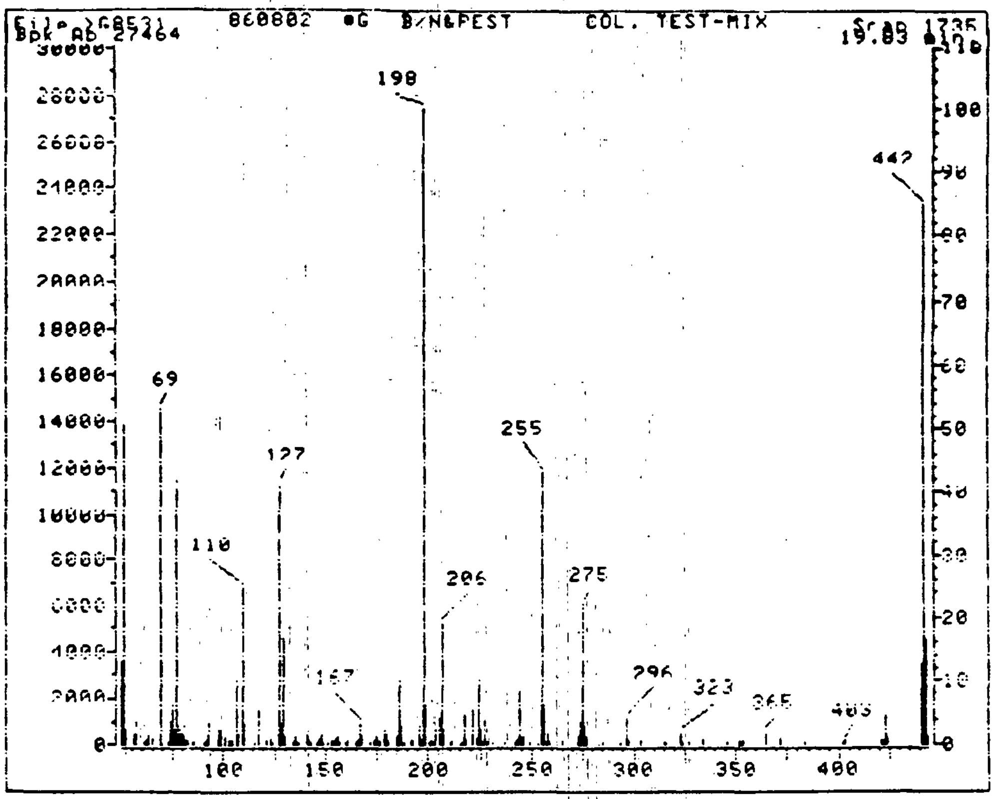


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [illegible]
Injection Time: 15:34 Processor: Tom [illegible]
Run No: >G8531 QC Batch: QB5395
Spectrun No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

B 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0151	RESOURCE ENGINEERING	RES27514	SDB-2-36-38	860722	2100	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	71	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	71	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1600	ND	ND	ND	0	-	ND	4040	7[illegible]
5B	Benzo(a)anthracene	ND	290	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	93	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	370	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	150	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	210	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	210	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	525	370	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	71	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	370	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	71	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	93	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	370	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	160	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	610	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	ND	370	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	210	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	71	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	370	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	370	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	82	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	71	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0151	RESOURCE ENGINEERING	RES27514	SDB-2-36-38	860722	2100	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	71	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	34	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	370	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	60	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	170	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	82	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	60	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	71	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	370	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	370	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	71	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	200	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	71	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogeneous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0151	RESOURCE ENGINEERING	RES27514	SDB-2-36-38	86072	2100	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	101	23	120
2-Fluorobiphenyl	50	84	30	115
Terphenyl-D14	50	99	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

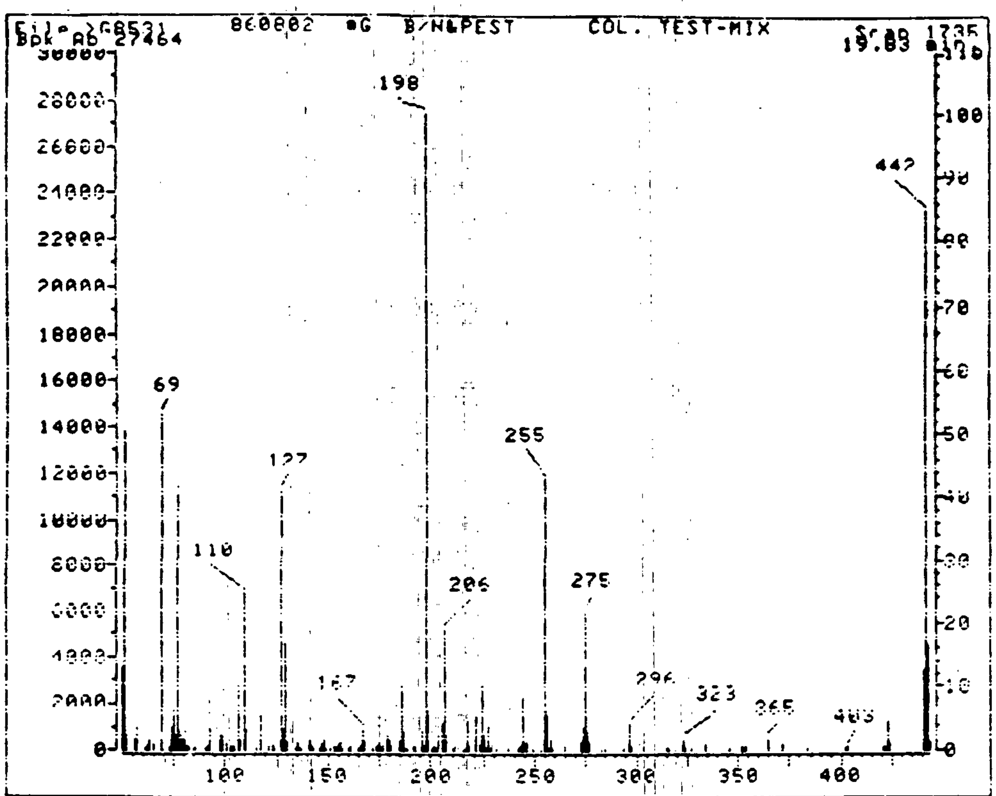


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

M/Z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86
Injection Time: 15:34
Run No: >G8531
Spectrum No: 1735

Analyst: [illegible]
Processor: Tom [illegible]
QC Batch: QB5395
Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

B 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0152	RESOURCE ENGINEERING	RES27514	SDB-2-40-42	860722	2105	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[a]	QC Replicate: Second ug/kg[a]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	74	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	74	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7[illegible]
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	97	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B'	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	ND	390	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	74	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	74	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	97	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	ND	390	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	74	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	390	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	85	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	74	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0152	RESOURCE ENGINEERING	RES27514	SDB-2-40-42	860722	2105	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg^a	QC Replicate: Second ug/kg^a	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov.	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov.
33B	Hexachlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	35	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	62	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	85	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	62	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	74	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	74	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	74	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	87

a Results variable due to Non-Homogenous sample matrix.

b Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0152	RESOURCE ENGINEERING	RES27514	SDB-2-40-42	86072	2105	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	101	23	120
2-Fluorobiphenyl	50	84	30	115
Terphenyl-D14	50	112	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

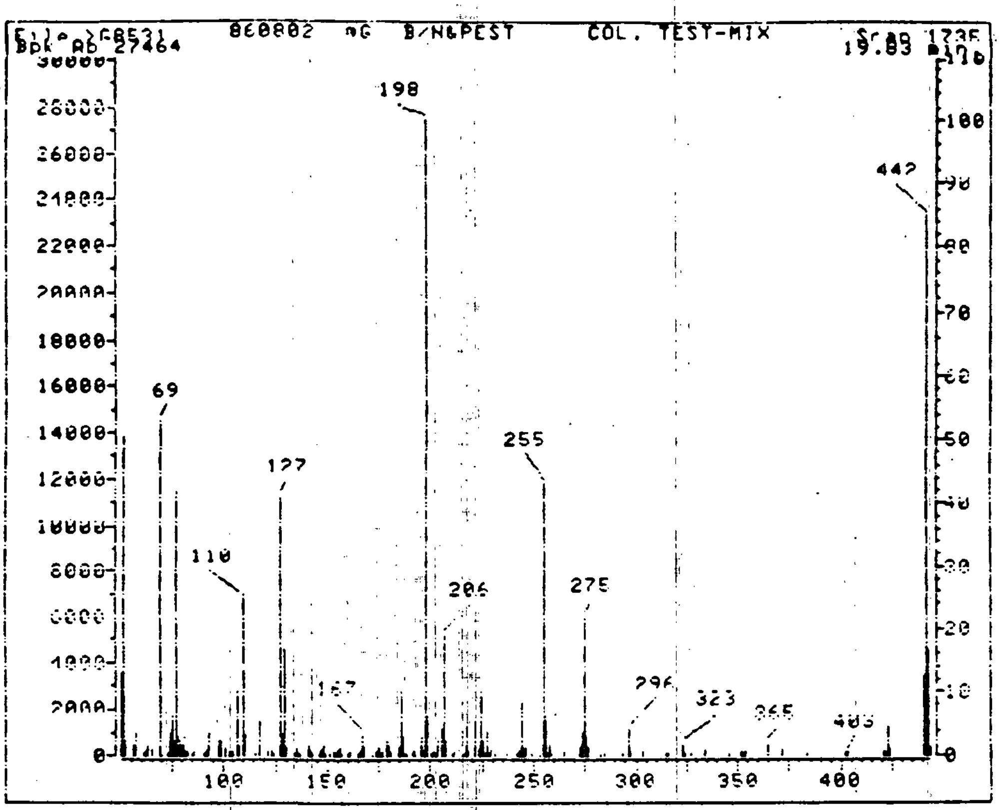


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86
Injection Time: 15:34
Run No: >G8531
Spectrum No: 1735

Analyst: [illegible]
Processor: Tom [illegible]
QC Batch: QB5395
Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

[illegible] 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0150	RESOURCE ENGINEERING	RES27514	SDB-2-46-48	860722	2120	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	74	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	74	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	7.
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	98	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	390	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	74	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	74	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	98	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	390	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	74	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	390	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	86	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	74	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0150	RESOURCE ENGINEERING	RES27514	SDB-2-46-48	860722	2120	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	35	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	63	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	86	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	63	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	74	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	74	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	74	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0150	RESOURCE ENGINEERING	RES27514	SDB-2-46-48	86072	2120	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	99	23	120
2-Fluorobiphenyl	50	87	30	115
Terphenyl-D14	50	93	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

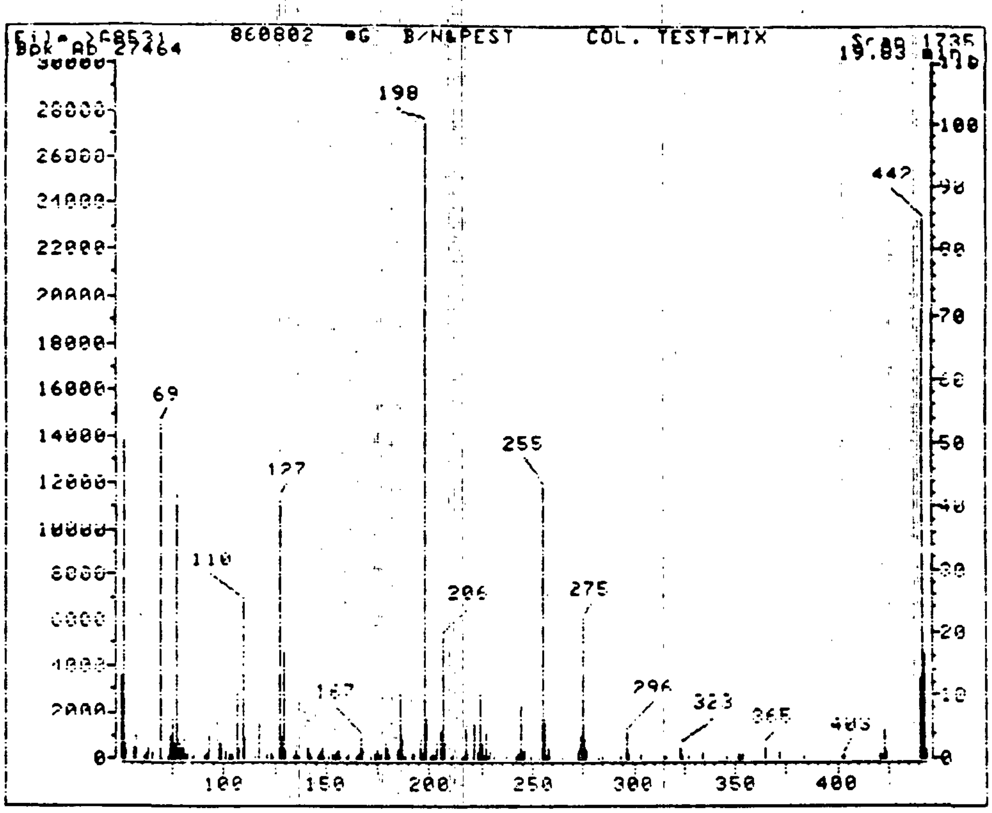


TABLE 2: METHOD PERFORMANCE DATA (OR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slapgrich
Injection Time: 15:34 Processor: Tom Lusouwez
Run No: >68531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8. 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0154	RESOURCE ENGINEERING	RES27514	SDB-2-50-52	860722	2125	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	76	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	76	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4040	7
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	400	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	76	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	76	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	660	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	ND	400	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	76	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	400	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	89	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	76	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8. 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0154	RESOURCE ENGINEERING	RES27514	SDB-2-50-52	860722	2125	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg*	Second ug/kg*	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	64	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	89	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	64	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	76	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	76	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	220	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	76	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	76	ND	ND	ND	0	-	ND	4040	87

* Results variable due to Non-Homogenous sample matrix.

* Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0154	RESOURCE ENGINEERING	RES27514	SDB-2-50-52	86072	2125	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	92	23	120
2-Fluorobiphenyl	50	81	30	115
Terphenyl-D14	50	101	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

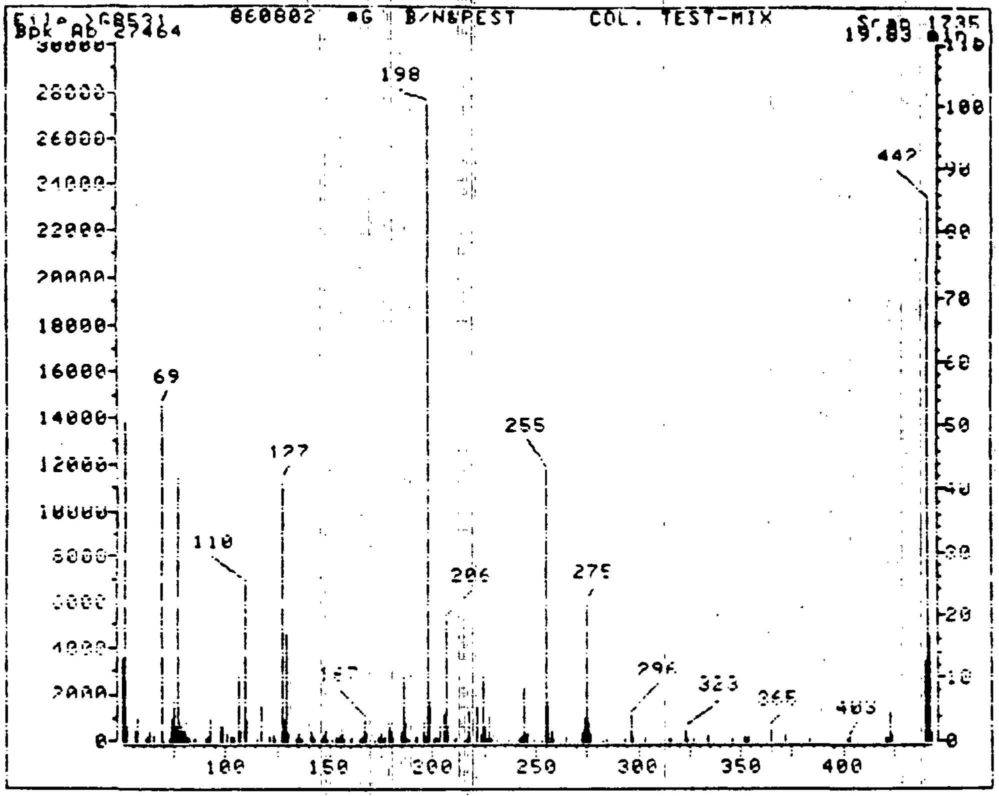


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86
Injection Time: 15:34
Run No: >G8531
Spectrum No: 1735

Analyst: Slappruch
Processor: Tom Lusowicz
QC Batch: QB5395
Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

B 8/8/86

Introduction

This report contains the analytical results on your soil sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Priority Pollutants

The priority pollutant compounds and elements are listed with their NPDES (National Pollution Discharge Elimination System) numbers, and the Method Detection Limit (MDL) published in the Federal Register. When a compound or element is present below its published MDL it is reported as BMDL (Below Method Detection Limit). When a compound or element is not present at any detectable concentrations it is reported as ND (Not Detected). MDL's for non-aqueous matrices are based on USEPA published MDL's but are adjusted as per sample weight. Matrix spike and replicate analyses, where included, were performed on samples randomly chosen within each quality assurance batch and are therefore not necessarily spikes and replicates of this report's sample. Surrogate compound recovery data and instrument calibration data are included in the Method Performance Data Tables.

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0170	RESOURCE ENGINEERING	RES27514	SDB-3-30-32	860723	0050	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3290	0
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	BMDL	320	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	530	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	320	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3290	98

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0170	RESOURCE ENGINEERING	RES27514	SDB-3-30-32	860723	0050	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3290	90
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3290	111
44B	Phenanthrene	ND	170	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	93

a Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 1, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0170	RESOURCE ENGINEERING	RES27514				0
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	73	20	140
2-Fluorobiphenyl	50	85	20	140
Terphenyl-D14	50	94	20	150

* IFB EPA Control Limits

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0168	RESOURCE ENGINEERING	RES27514	SDB-3-44-46	860723	0140	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	60	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	60	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3290	0a
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	80	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	ND	320	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	60	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	60	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	130	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	80	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	60	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	60	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	520	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	320	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	60	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	70	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	60	ND	ND	ND	0	-	ND	3290	98

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0168	RESOURCE ENGINEERING	RES27514	SDB-3-44-46	860723	0140	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	60	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	51	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	70	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	51	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	60	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3290	90
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44B	Phenanthrene	ND	170	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	60	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	60	ND	ND	ND	0	-	ND	3290	93

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 1, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0168	RESOURCE ENGINEERING	RES27514				0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	59	20	140
2-Fluorobiphenyl	50	65	20	140
Terphenyl-D14	50	95	20	150

* EPA EPA Control Limits

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0171	RESOURCE ENGINEERING	RES27514	SDB-3-46-48	860723	0145	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3290	0
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	ND	320	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	320	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3290	98

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5. 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0171	RESOURCE ENGINEERING	RES27514	SDB-3-46-48	860723	0145	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3290	90
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3290	111
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3290	93

* Recovery normally variable using established methodology.

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TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0171	RESOURCE ENGINEERING	RES27514				0
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	79	20	140
2-Fluorobiphenyl	50	90	20	140
Terphenyl-D14	50	106	20	150

* IFB EPA Control Limits

Introduction

This report contains the analytical results on your soil sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Priority Pollutants

The priority pollutant compounds and elements are listed with their NPDES (National Pollution Discharge Elimination System) numbers, and the Method Detection Limit (MDL) published in the Federal Register. When a compound or element is present below its published MDL it is reported as BMDL (Below Method Detection Limit). When a compound or element is not present at any detectable concentrations it is reported as ND (Not Detected). MDL's for non-aqueous matrices are based on USEPA published MDL's but are adjusted as per sample weight. Matrix spike and replicate analyses, where included, were performed on samples randomly chosen within each quality assurance batch and are therefore not necessarily spikes and replicates of this report's sample. Surrogate compound recovery data and instrument calibration data are included in the Method Performance Data Tables.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0167	RESOURCE ENGINEERING	RES27514	SDB-3-48-50	860723	0150	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3290	94
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3290	96
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3290	100
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3290	0a
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3290	101
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3290	100
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3290	105
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3290	90
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3290	93
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3290	88
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3290	70
13B	bis(2-Ethylhexyl)phthalate	ND	330	41.2	70.4	BMDL	0	-	ND	3290	105
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3290	99
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	101
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3290	93
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3290	99
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3290	91
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3290	88
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3290	88
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3290	89
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3290	88
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	104
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	99
26B	Di-n-butyl phthalate	ND	330	ND	ND	458	0	-	ND	3290	113
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3290	105
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3290	94
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3290	103
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3290	102
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3290	109
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3290	98

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0167	RESOURCE ENGINEERING	RES27514	SDB-3-48-50	860723	0150	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3290	101
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3290	93
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3290	90
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3290	93
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3290	95
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3290	90
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3290	90
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3290	111
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3290	103
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3290	113
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3290	93

a Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0167	RESOURCE ENGINEERING	RES27514				0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	83	20	140
2-Fluorobiphenyl	50	88	20	140
Terphenyl-D14	50	105	20	150

* IFB EPA Control Limits

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0181	RESOURCE ENGINEERING	RES27514	SDB-4-28-30	860723	2050	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	61	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	61	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	80	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	320	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	61	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	61	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	130	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	80	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	530	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	92
26B	Di-n-butyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	61	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	70	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	61	ND	ND	ND	0	-	ND	3280	91

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0181	RESOURCE ENGINEERING	RES27514	SDB-4-28-30	860723	2050	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	51	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	70	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	51	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	61	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	61	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	170	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	61	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0181	RESOURCE ENGINEERING	RES27514	SDB-4-28-30	86072	2050	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	76	23	120
2-Fluorobiphenyl	50	90	30	115
Terphenyl-D14	50	58	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* CLP EPA Control Limits

** Advisory Limits Only

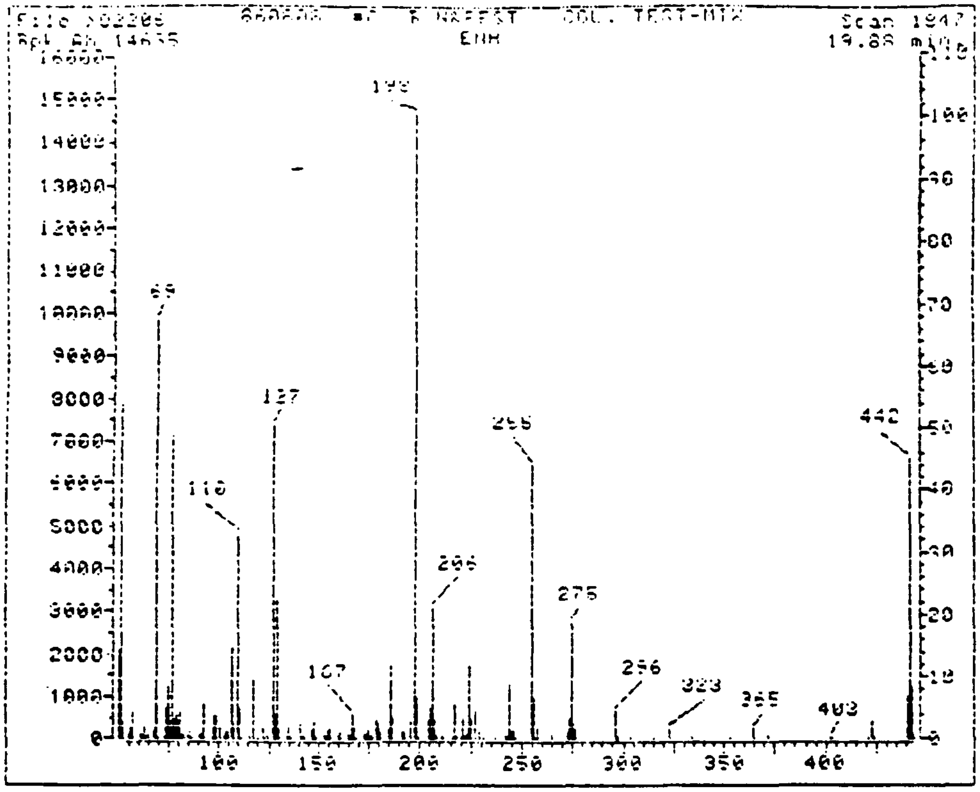

TABLE 2: METHOD PERFORMANCE DATA (DR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: OB5420
Spectrum No: 1847 Samples: N0161 - N0165
N0179 - N0190

VJ 8/13/86

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0184	RESOURCE ENGINEERING	RES27514	SDB-4-34-36	860723	2100	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0.
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92.
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0184	RESOURCE ENGINEERING	RES27514	SDB-4-34-36	860723	2100	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

* Recovery normally variable using established methodology.

@ Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0184	RESOURCE ENGINEERING	RES27514	SDB-4-34-36	86072	2100	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	89	23	120
2-Fluorobiphenyl	50	103	30	115
Terphenyl-D14	50	104	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

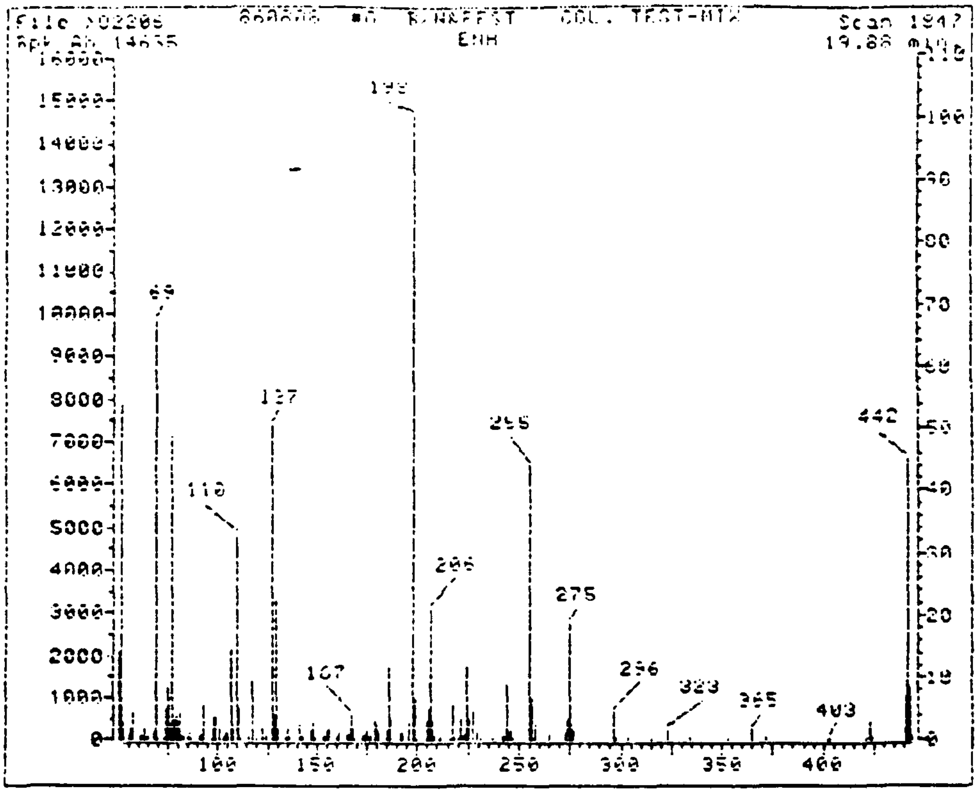

TABLE 2: METHOD PERFORMANCE DATA (DR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: QB5420
Spectrum No: 1847 Samples: N0161-N0165
N0179-N0190

VB 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0183	RESOURCE ENGINEERING	RES27514	SDB-4-38-40	860723	2110	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0[a]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92[a]
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0183	RESOURCE ENGINEERING	RES27514	SDB-4-38-40	860723	2110	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound*	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	BMDL	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery normally verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0183	RESOURCE ENGINEERING	RES27514	SDB-4-38-40	86072	2110	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	90	23	120
2-Fluorobiphenyl	50	98	30	115
Terphenyl-D14	50	72	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* [illegible] Control Limits

** Advisory Limits Only

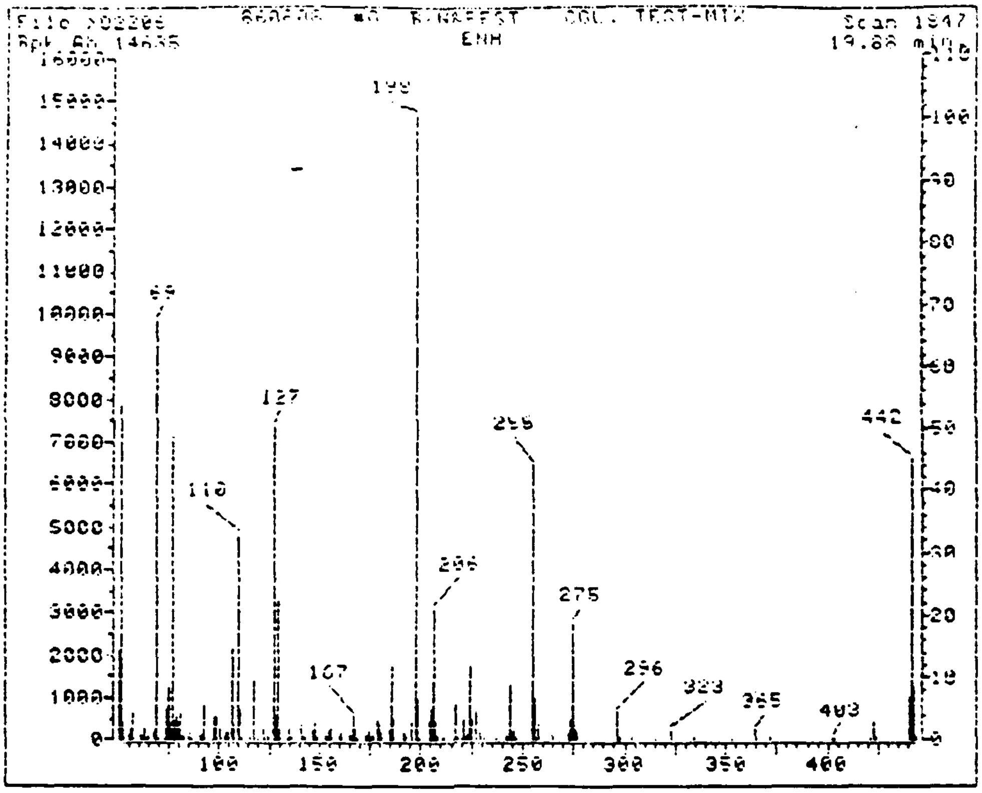

TABLE 2: METHOD PERFORMANCE DATA (GR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86
Injection Time: 14:18
Run No: >U2206
Spectrum No: 1847

Analyst: [signature]
Processor: Sharon Matlock
QC Batch: OB5420
Samples: N0161 - N0165
N0179 - N0190

VB 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0179	RESOURCE ENGINEERING	RES27514	SDB-4-46-48	860723	2205	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0179	RESOURCE ENGINEERING	RES27514	SDB-4-46-48	860723	2205	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0179	RESOURCE ENGINEERING	RES27514	SDB-4-46-48	86072	2205	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	79	23	120
2-Fluorobiphenyl	50	105	30	115
Terphenyl-D14	50	76	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* [illegible] EPA Control Limits

** Advisory Limits Only

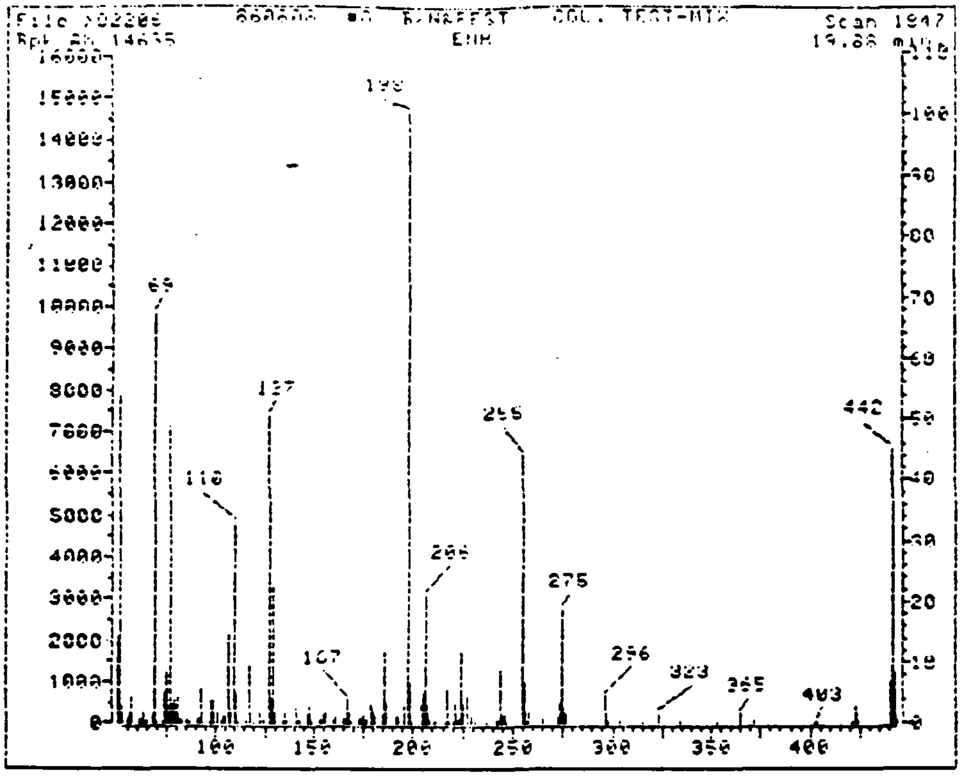

TABLE 2: METHOD PERFORMANCE DATA (OR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.38	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst:

Injection Time: 14:18 Processor:

Run No: >U2206 QC Batch: 08.5420

Spectrum No: 1847 Samples: N0161 - N0165

N0179 - N0190

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0182	RESOURCE ENGINEERING	RES27514	SDB-4-50-52	860723	2215	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

@ Recovery normally variable using established methodology.

$ Recovery manually verified.

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0182	RESOURCE ENGINEERING	RES27514	SDB-4-50-52	860723	2215	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0.
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92.
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	72	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

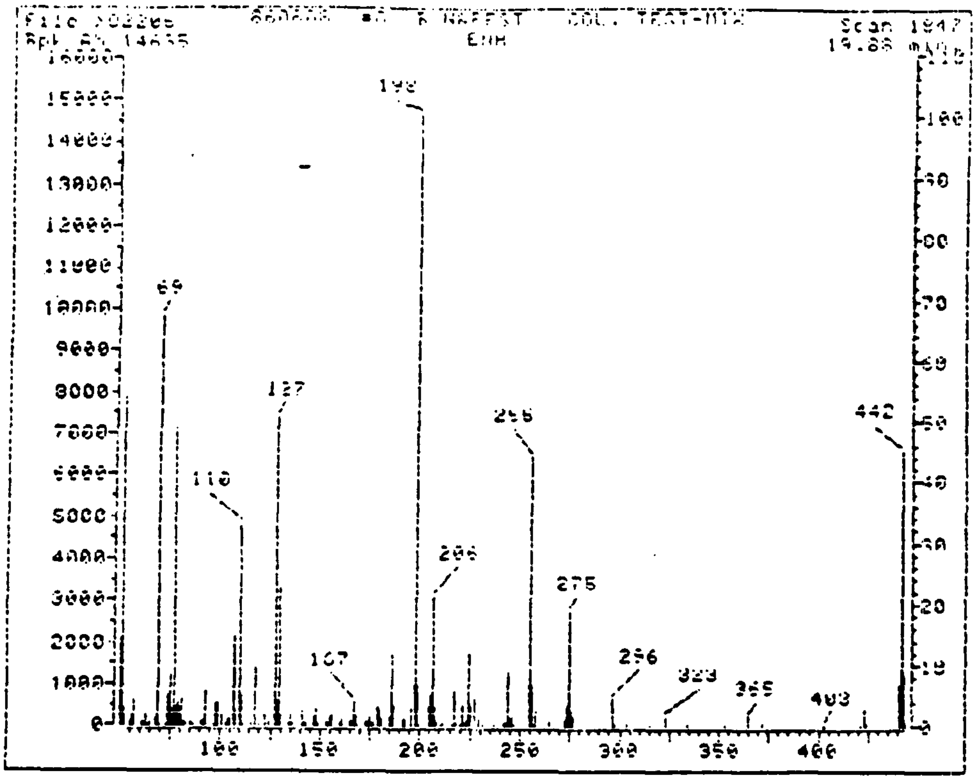

TABLE 2: METHOD PERFORMANCE DATA (DR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86
Injection Time: 14:18
Run No: >U2206
Spectrum No: 1847

Analyst: [illegible]
Processor: Sharon Marlock
QC Batch: 085420
Samples: N0161 - N0165
N0179 - N0190

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0182	RESOURCE ENGINEERING	RES27514	SDB-4-50-52	86072	2215	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	89	23	120
2-Fluorobiphenyl	50	101	30	115
Terphenyl-D14	50	79	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20	150

* [illegible] Control Limits

** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0180	RESOURCE ENGINEERING	RES27514	SDB-4-56-58	860723	2235	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	51	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	51	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	61	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	61	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	170	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	61	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	90

* Recovery normally variable using established methodology.

@ Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0180	RESOURCE ENGINEERING	RES27514	SDB-4-56-58	860723	2235	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	61	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	61	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0*
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	80	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	320	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	61	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	61	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	130	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	80	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	61	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	530	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	97*
26B	Di-n-butyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	61	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	61	ND	ND	ND	0	-	ND	3280	91

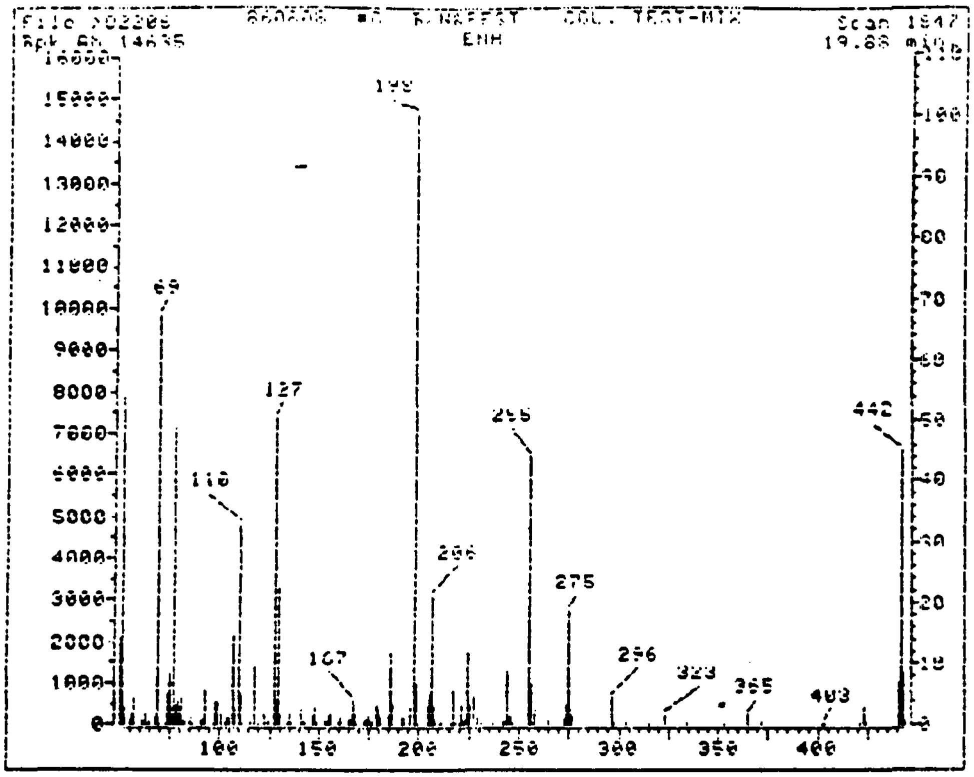

TABLE 2: METHOD PERFORMANCE DATA (DR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [illegible]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: 08.5420
Spectrum No: 1847 Samples: N0161- N0165
N0179 - N0190

VS 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0180	RESOURCE ENGINEERING	RES27514	SDB-4-56-58	86072	2235	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	79	23	120
2-Fluorobiphenyl	50	109	30	115
Terphenyl-D14	50	79	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS – GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0186	RESOURCE ENGINEERING	RES27514	SDB-5-10-12	860724	1950	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg [A]	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	310	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	150	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	1600	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	260	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	760	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	360	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	1590	260	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	310	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	1600	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	1600	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	310	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	870	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	310	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	310	ND	ND	ND	0	-	ND	3280	90

A Large final volume of extract resulted in elevated MDLs.

B Recovery normally variable using established methodology.

C Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0186	RESOURCE ENGINEERING	RES27514	SDB-5-10-12	860724	1950	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	310	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	570	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	310	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	7100	ND	ND	ND	0	-	ND	3280	0
5B	Benzo(a)anthracene	ND	1300	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	400	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	1600	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	660	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	570	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	860	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	920	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	920	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	310	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	310	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	680	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	400	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	1600	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	310	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	310	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	710	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	2700	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	92
26B	Di-n-butyl phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	920	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	310	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	1600	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	1600	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	360	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	310	ND	ND	ND	0	-	ND	3280	91

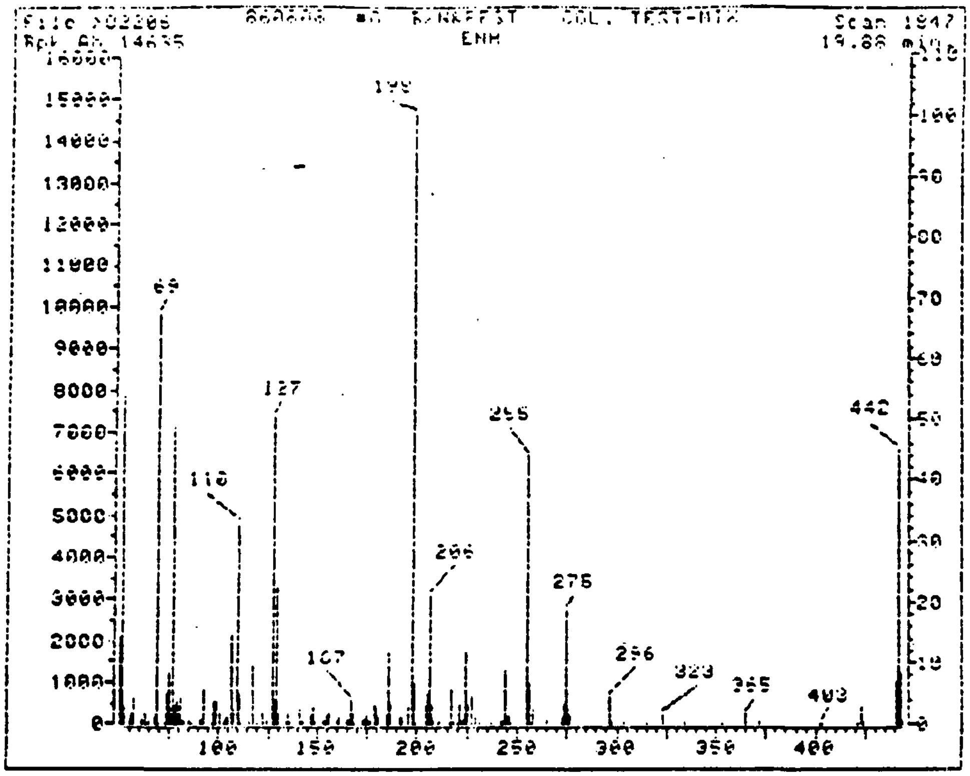

TABLE 2: METHOD PERFORMANCE DATA (OR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [illegible]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: OB5420
Spectrum No: 1847 Samples: N0161- N0165
N0179 - N0190

VJ 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0186	RESOURCE ENGINEERING	RES27514	SDB-5-10-12	86072	1950	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	80	23	120
2-Fluorobiphenyl	50	103	30	115
Terphenyl-D14	50	77	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* [illegible] Control Limits

** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0190	RESOURCE ENGINEERING	RES27514	SDB-5-26-28	860725	0530	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

Introduction

This report contains the analytical results on your soil sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Priority Pollutants

The priority pollutant compounds and elements are listed with their NPDES (National Pollution Discharge Elimination System) numbers, and the Method Detection Limit (MDL) published in the Federal Register. When a compound or element is present below its published MDL it is reported as BMDL (Below Method Detection Limit). When a compound or element is not present at any detectable concentrations it is reported as ND (Not Detected). MDL's for non-aqueous matrices are based on USEPA published MDL's but are adjusted as per sample weight. Matrix spike and replicate analyses, where included, were performed on samples randomly chosen within each quality assurance batch and are therefore not necessarily spikes and replicates of this report's sample. Surrogate compound recovery data and instrument calibration data are included in the Method Performance Data Tables.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0190	RESOURCE ENGINEERING	RES27514	SDB-S-26-28	86072	0530	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	79	23	120
2-Fluorobiphenyl	50	97	30	115
Terphenyl-D14	50	73	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0190	RESOURCE ENGINEERING	RES27514	SDB-5-26-28	860725	0530	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

a Recovery normally variable using established methodology.

b Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0187	RESOURCE ENGINEERING	RES27514	SDB-5-32-34	860725	0545	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

* Recovery normally variable using established methodology.
# Recovery annually verified.

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0187	RESOURCE ENGINEERING	RES27514	SDB-5-32-34	860725	0545	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0*
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92*
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

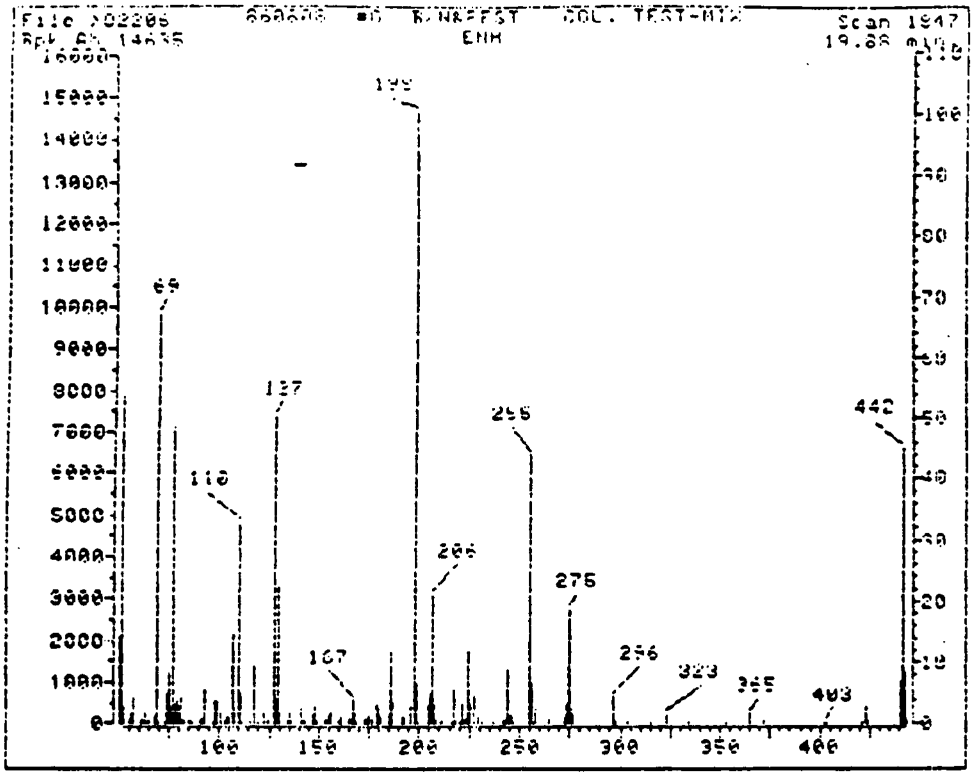

TABLE 2: METHOD PERFORMANCE DATA (DR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86
Injection Time: 14:18
Run No: >U2206
Spectrum No: 1847

Analyst: [illegible]
Processor: Sharon Matlock
QC Batch: OB5420
Samples: N0161- N0165
N0179 - N0190

VB 8/13/86

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0187	RESOURCE ENGINEERING	RES27514	SDB-5-32-34	86072	0545	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	82	23	120
2-Fluorobiphenyl	50	99	30	115
Terphenyl-D14	50	78	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* [illegible] EPA Control Limits

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0189	RESOURCE ENGINEERING	RES27514	SDB-5-40-42	860725	0555	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0.
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	62
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3280	90
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20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92.
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	72	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3280	91

Introduction

This report contains the analytical results on your soil sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0189	RESOURCE ENGINEERING	RES27514	SDB-5-40-42	86072	0555	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	75	23	120
2-Fluorobiphenyl	50	86	30	115
Terphenyl-D14	50	65	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0189	RESOURCE ENGINEERING	RES27514	SDB-5-40-42	860725	0555	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

Introduction

This report contains the analytical results on your soil sample. It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review.

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification. Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e. matrix spike) and replicate sample as well as results from surrogate compound analyses. Quality assurance data for verification of proper instrument performance is also included where appropriate. The report appendices include the chain of custody record for your sample and, where appropriate, the gas chromatograms and mass spectra.

The procedures used in the analysis of the sample are described in this report's methodology section. All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol. A description of this Protocol is included in the report.

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables. The format of each table varies with the class of analysis.

Priority Pollutants

The priority pollutant compounds and elements are listed with their NPDES (National Pollution Discharge Elimination System) numbers, and the Method Detection Limit (MDL) published in the Federal Register. When a compound or element is present below its published MDL it is reported as BMDL (Below Method Detection Limit). When a compound or element is not present at any detectable concentrations it is reported as ND (Not Detected). MDL's for non-aqueous matrices are based on USEPA published MDL's but are adjusted as per sample weight. Matrix spike and replicate analyses, where included, were performed on samples randomly chosen within each quality assurance batch and are therefore not necessarily spikes and replicates of this report's sample. Surrogate compound recovery data and instrument calibration data are included in the Method Performance Data Tables.

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0188	RESOURCE ENGINEERING	RES27514	SDB-5-48-50	860725	0610	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0 [A]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92 [B]
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0188	RESOURCE ENGINEERING	RES27514	SDB-5-48-50	860725	0610	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0188	RESOURCE ENGINEERING	RES27514	SDB-5-48-50	86072	0610	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	81	23	120
2-Fluorobiphenyl	50	93	30	115
Terphenyl-D14	50	78	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0185	RESOURCE ENGINEERING	RES27514	SDB-5-58-60	860725	0640	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0185	RESOURCE ENGINEERING	RES27514	SDB-5-58-60	860725	0640	

		Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
NPDES Number	Compound	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0 [A]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92 [B]
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0185	RESOURCE ENGINEERING	RES27514	SDB-5-58-60	86072	0640	0
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	11[illegible]
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	92	23	120
2-Fluorobiphenyl	50	107	30	115
Terphenyl-D14	50	93	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

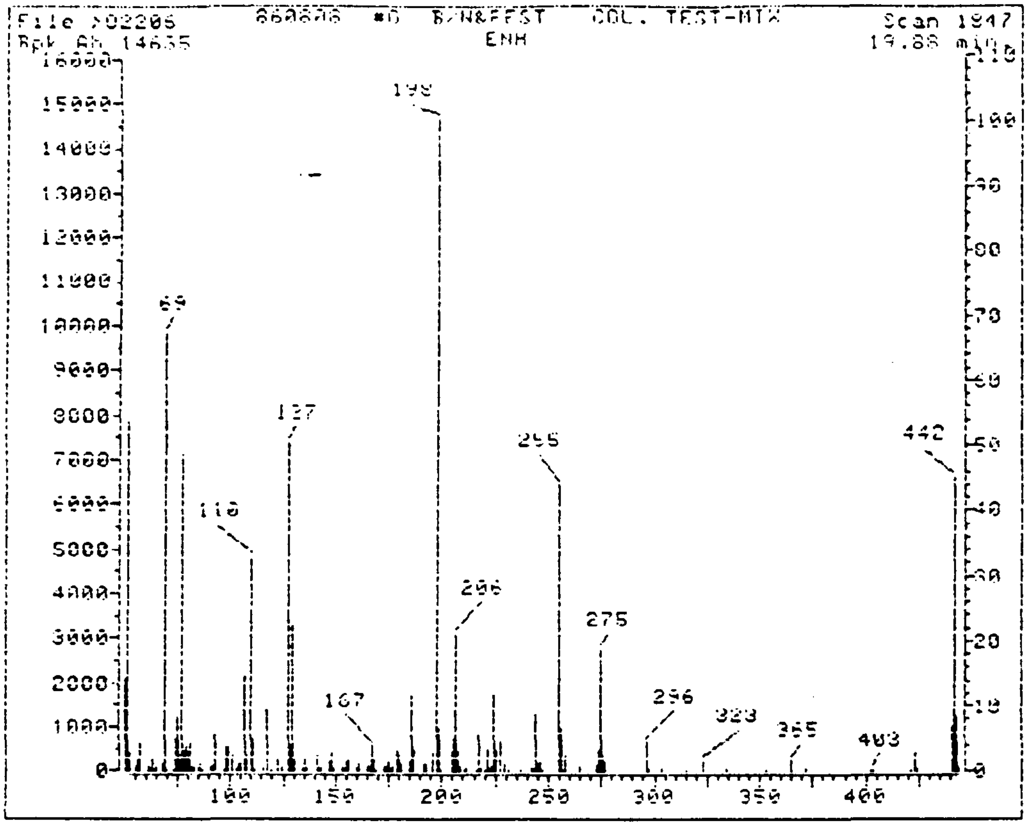

TABLE 2: METHOD PERFORMANCE DATA (GR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >02206 QC Batch: QB5420
Spectrum No: 1847 Samples: N0161- N0165
N0179 - N0190

VB 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0162	RESOURCE ENGINEERING	RES27514	SDB-6-12-14	860724	0230	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg[a]	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	320	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	580	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	320	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	7300	ND	ND	ND	0	-	ND	3280	0[B]
5B	Benzo(a)anthracene	ND	1300	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	420	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	1700	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	680	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	580	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	880	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	950	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	950	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	320	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	320	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	700	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	420	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	1700	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	320	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	320	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	730	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	2700	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	92[c]
26B	Di-n-butyl phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	950	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	320	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	1700	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	1700	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	370	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	320	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0162	RESOURCE ENGINEERING	RES27514	SDB-6-12-14	860724	0230	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg[A]	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	320	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	150	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	1700	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	270	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	780	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	370	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	270	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	320	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	1700	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	1700	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	320	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	900	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	320	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	320	ND	ND	ND	0	-	ND	3280	90

A Large final volume of extract resulted in elevated MDLs.

B Recovery normally variable using established methodology.

C Recovery manually verified.

August 13, 1986

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0162						

Compound	Amount Added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	86	23	120
2-Fluorobiphenyl	50	109	30	115
Terphenyl-D14	50	91	18	137
PESTICIDE/PCB FRACTION (GC/MS)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits.
** Advisory Limits Only.

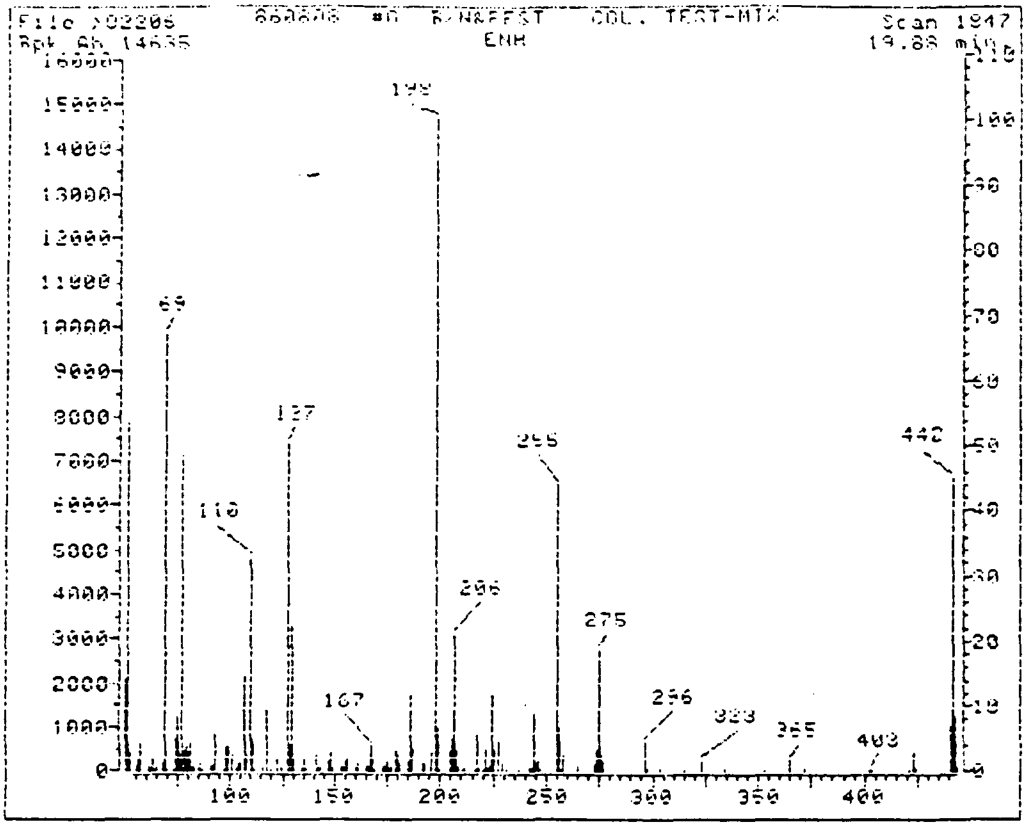

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.38	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86   Analyst: [illegible]
Injection Time: 14:18   Processor: Sharon Matlock
Run No: >U2206   QC Batch: QB5420
Spectrun No: 1847   Samples: N0161- N0165
N0179 - N0190

8/13/86

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0161	RESOURCE ENGINEERING	RES27514	SDB-6-28-30	860724	0305	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0[a]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92[a]
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0161	RESOURCE ENGINEERING	RES27514	SDB-6-28-30	860724	0305	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	67.4	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 12. 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0161	RESOURCE ENGINEERING	RES27514	SDB-6-28-30	86072	0305	0

Compound	Amount added	% Recovery	Control Limits, Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	85	23	120
2-Fluorobiphenyl	50	112	30	115
Terphenyl-D14	50	86	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

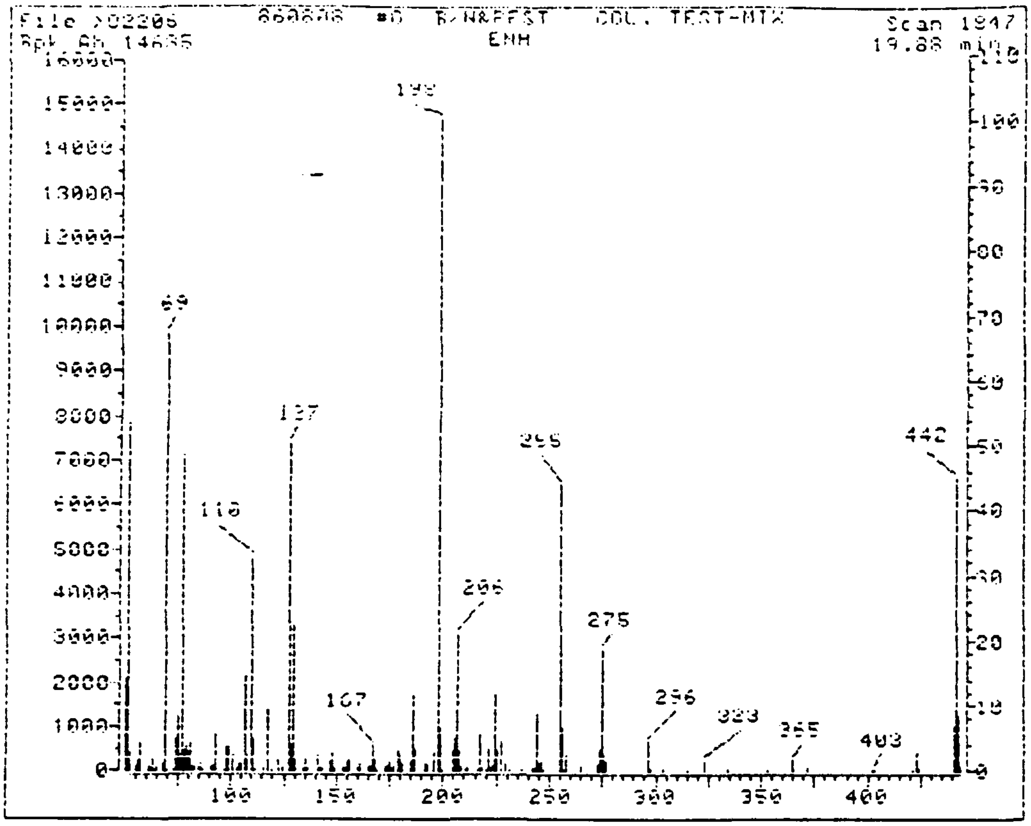

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: OB5420
Spectrum No: 1847 Samples: N0161 - N0165
N0179 - N0190

8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0164	RESOURCE ENGINEERING	RES27514	SDB-6-38-40	860724	0350	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0 a
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	320	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	92 B
26B	Di-n-butyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0164	RESOURCE ENGINEERING	RES27514	SDB-6-38-40	860724	0350	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery normally verified.

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0164	RESOURCE ENGINEERING	RES27514	SDB-6-38-40	86072	0350	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	90	23	120
2-Fluorobiphenyl	50	101	30	115
Terphenyl-D14	50	76	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

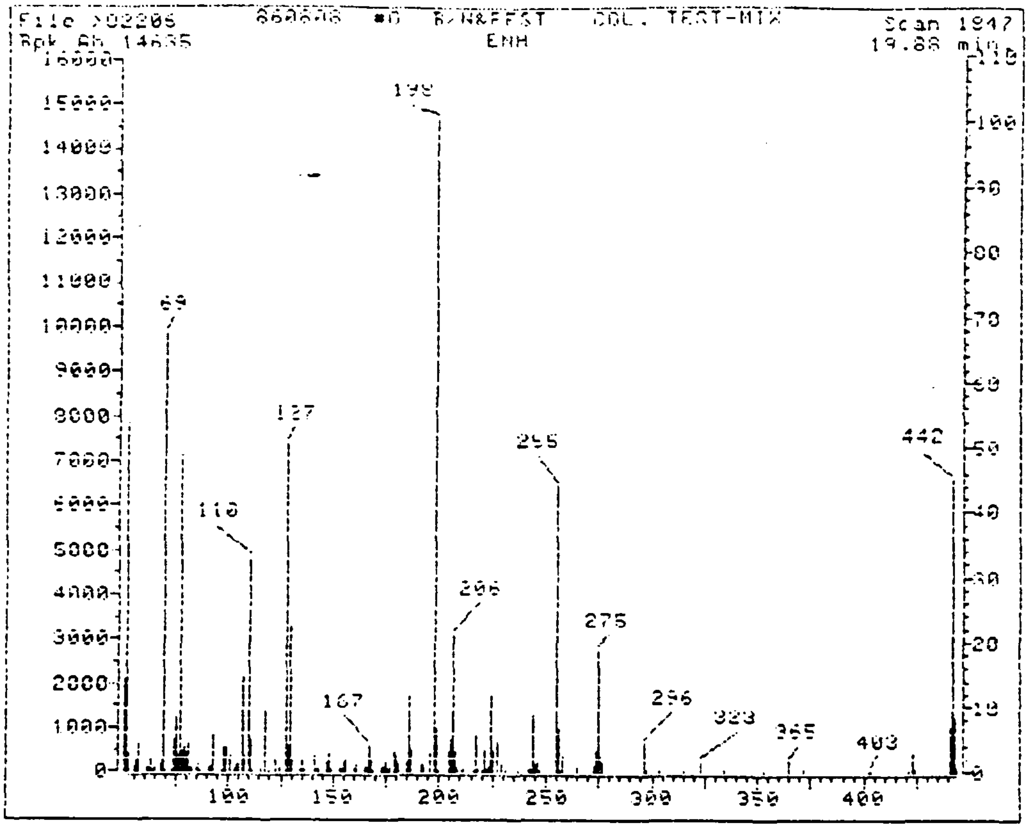

TABLE 2: METHOD PERFORMANCE DATA (GR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: QB5420
Spectrum No: 1847 Samples: N0161 - N0165
N0179 - N0190

VD 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0165	RESOURCE ENGINEERING	RES27514	SDB-6-48-50	860724	0410	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	62	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3280	0A
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92B
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	72	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	62	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0165	RESOURCE ENGINEERING	RES27514	SDB-6-48-50	860724	0410	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	52	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	62	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0165	RESOURCE ENGINEERING	RES27514	SDB-6-48-50	86072	0410	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	88	23	120
2-Fluorobiphenyl	50	98	30	115
Terphenyl-D14	50	83	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

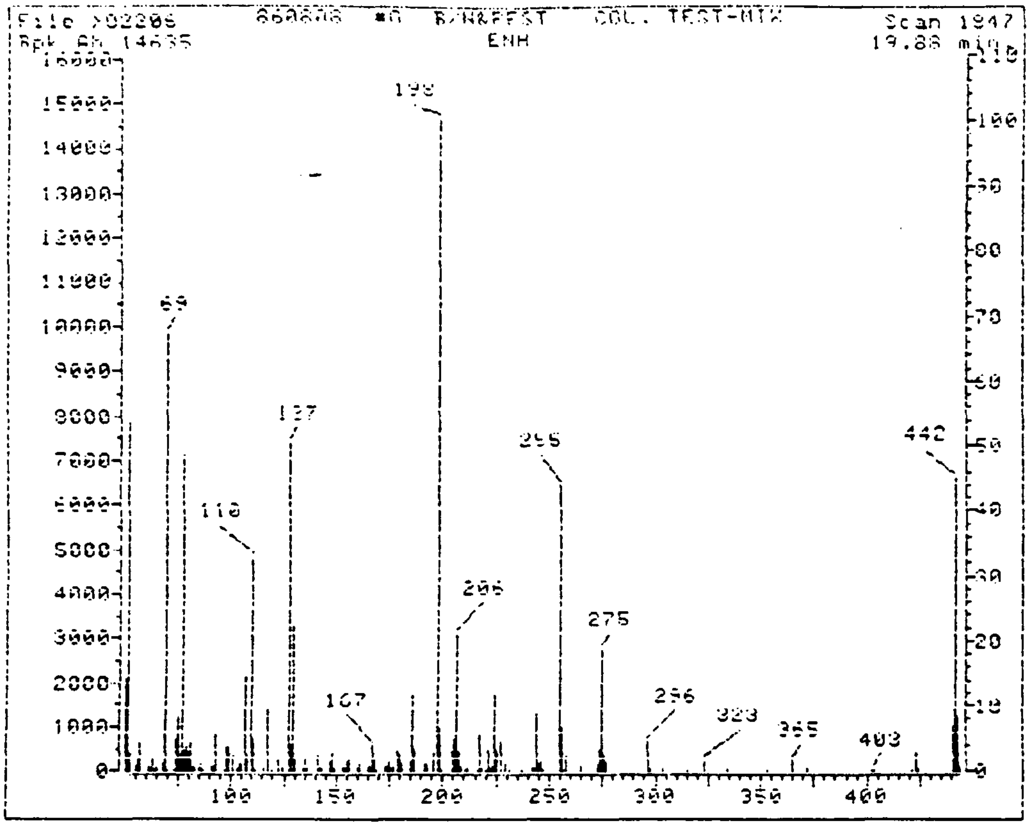

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86   Analyst: [illegible]
Injection Time: 14:18   Processor: Sharon Matlock
Run No: >02206   QC Batch: OB5420
Spectrum No: 1847   Samples: N0161-N0165
N0179-N0190

VB 8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0163	RESOURCE ENGINEERING	RES27514	SDB-6-52-54	860724	0420	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3280	91
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3280	76
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3280	82
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3280	0[a]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3280	88
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3280	64
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3280	76
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3280	74
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3280	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3280	89
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3280	57
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	ND	0	-	ND	3280	82
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3280	100
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3280	90
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3280	89
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3280	98
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	83
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	84
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3280	87
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3280	6
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	94
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	92[a]
26B	Di-n-butyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	81
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3280	82
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3280	87
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3280	80
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3280	85
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3280	69
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3280	91

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0163	RESOURCE ENGINEERING	RES27514	SDB-6-52-54	860724	0420	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	100
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3280	91
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3280	92
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3280	90
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3280	90
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3280	93
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3280	87
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3280	74
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3280	96
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3280	66
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3280	90

A Recovery normally variable using established methodology.

B Recovery manually verified.

AUG 12, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0163	RESOURCE ENGINEERING	RES27514	SDB-6-52-54	86072	0420	0
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	88	110
p-Bromofluorobenzene	-	-	86	115
1,2-Dichloroethane-D4	-	-	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	83	35	114
2-Fluorobiphenyl	50	103	43	116
Terphenyl-D14	50	82	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

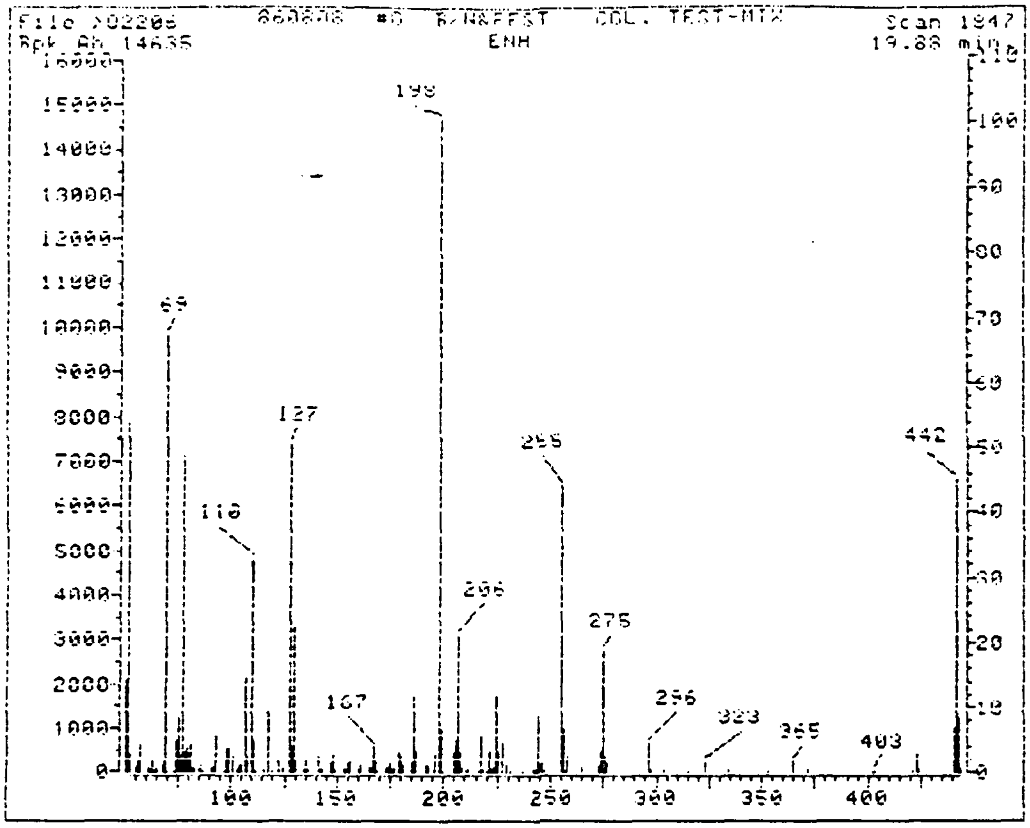

TABLE 2: METHOD PERFORMANCE DATA (GR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.67	53.67	Ok
68	Less than 2% of mass 69	1.18	1.76	Ok
69	(reference only)	67.08	67.08	Ok
70	Less than 2% of mass 69	.12	.18	Ok
127	40-60% of mass 198	50.42	50.42	Ok
197	Less than 1% of mass 198	.14	.14	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.52	6.52	Ok
275	10-30% of mass 198	18.68	18.68	Ok
365	Greater than 1% of mass 198	1.61	1.61	Ok
441	0-100% of mass 443	6.71	78.75	Ok
442	Greater than 40% of mass 198	44.76	44.76	Ok
443	17-23% of mass 442	8.52	19.03	Ok

Injection Date: 08/08/86 Analyst: [signature]
Injection Time: 14:18 Processor: Sharon Matlock
Run No: >U2206 QC Batch: OB5420
Spectrum No: 1847 Samples: N0161- N0165
N0179 - N0190

8/13/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0132	RESOURCE ENGINEERING	RES27514	SDB-7-26-28	860719	0015	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	ND	77	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	77	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4090	0R
5B	Benzo(a)anthracene	ND	320	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	400	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	77	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	77	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	670	ND	ND	ND	0	-	ND	4090	32R
24B	Diethyl phthalate	BMDL	400	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	400	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	77	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	400	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	89	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	77	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0132	RESOURCE ENGINEERING	RES27514	SDB-7-26-28	860719	0015	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	65	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	89	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	BMDL	65	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	77	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	77	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	220	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	77	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	88

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0132	RESOURCE ENGINEERING	RES27514	SDB-7-26-28	86071	0015	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	89	20	140
2-Fluorobiphenyl	50	74	20	140
Terphenyl-D14	50	69	20	150

* IFB EPA Control Limits

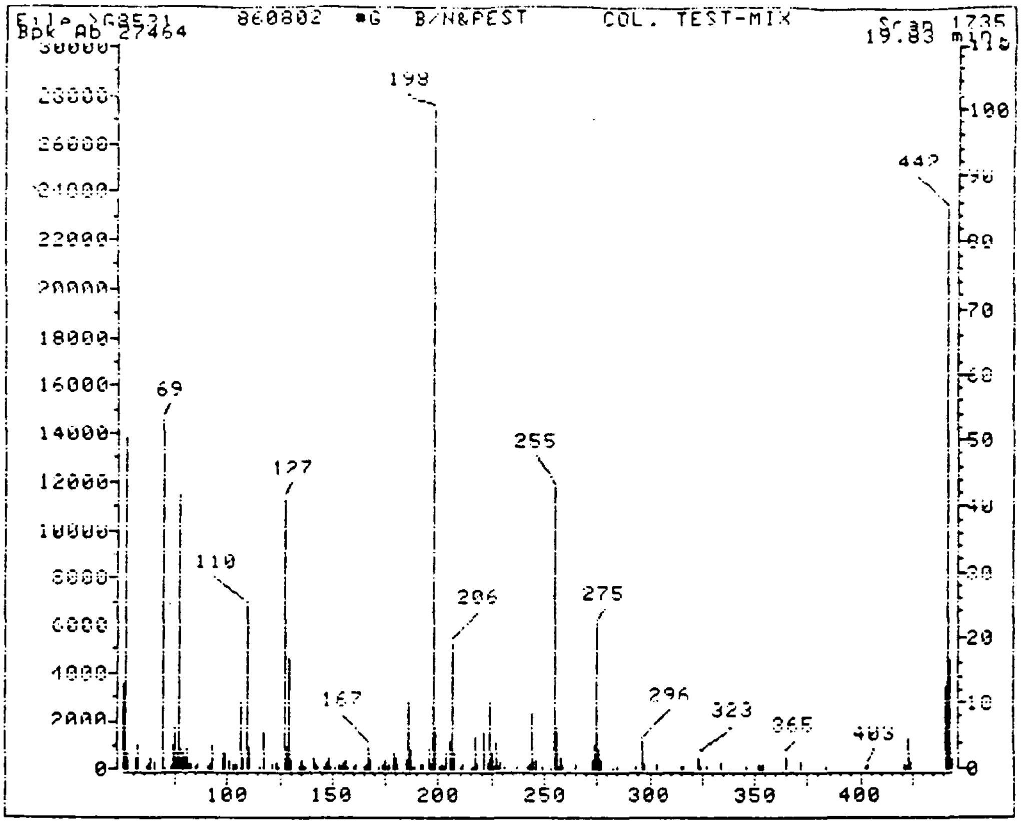

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [illegible]
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB 5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CP 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0135	RESOURCE ENGINEERING	RES27514	SDB-7-38-40	860719	0035	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	ND	71	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	71	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1600	ND	ND	ND	0	-	ND	4090	0a
5B	Benzo(a)anthracene	ND	290	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	93	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	370	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	150	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	210	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	210	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	ND	370	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	71	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	71	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	93	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	370	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	160	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	610	ND	ND	ND	0	-	ND	4090	32a
24B	Diethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	370	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	210	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	71	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	370	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	370	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	82	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	71	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0135	RESOURCE ENGINEERING	RES27514	SDB-7-38-40	860719	0035	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	71	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	33	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	370	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	59	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	170	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	82	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	59	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	71	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	370	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	370	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	71	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	200	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	71	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	71	ND	ND	ND	0	-	ND	4090	88

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0135	RESOURCE ENGINEERING	RES27514	SDB-7-38-40	86071	0035	0

Compound	Amount added ug	% Recovery	Control Limits * Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	92	20	140
2-Fluorobiphenyl	50	80	20	140
Terphenyl-D14	50	75	20	150

* IFB EPA Control Limits

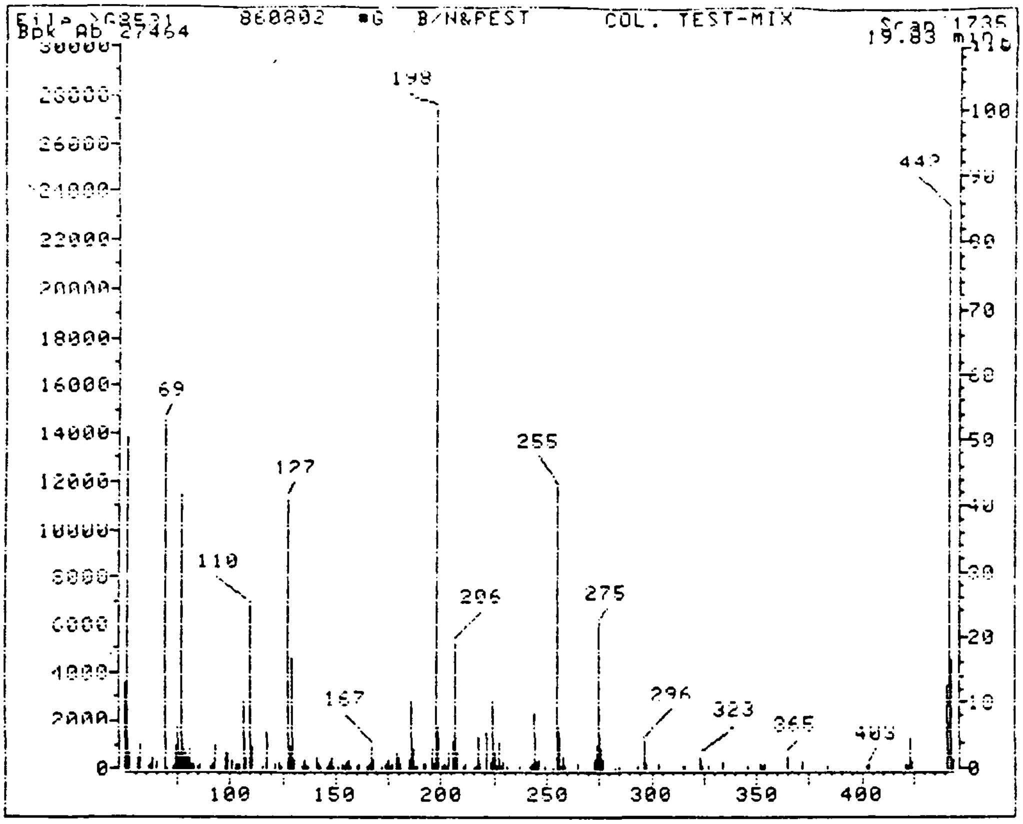

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [illegible]
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N014[illegible]

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

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TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0134	RESOURCE ENGINEERING	RES27514	SDB-7-42-44	860719	0125	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	70	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	70	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1600	ND	ND	ND	0	-	ND	4090	0[a]
5B	Benzo(a)anthracene	ND	290	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	92	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	370	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	150	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	210	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	210	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	370	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	70	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	70	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	92	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	370	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	70	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	70	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	160	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	610	ND	ND	ND	0	-	ND	4090	32[a]
24B	Diethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	370	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	370	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	210	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	70	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	370	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	370	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	81	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	70	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0134	RESOURCE ENGINEERING	RES27514	SDB-7-42-44	860719	0125	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	70	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	33	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	370	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	59	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	170	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	81	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	59	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	70	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	370	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	370	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	70	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	200	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	70	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	70	ND	ND	ND	0	-	ND	4090	88

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0134	RESOURCE ENGINEERING	RES27514	SDB-7-42-44	86071	0125	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	102	20	140
2-Fluorobiphenyl	50	89	20	140
Terphenyl-D14	50	83	20	150

* IFB EPA Control Limits

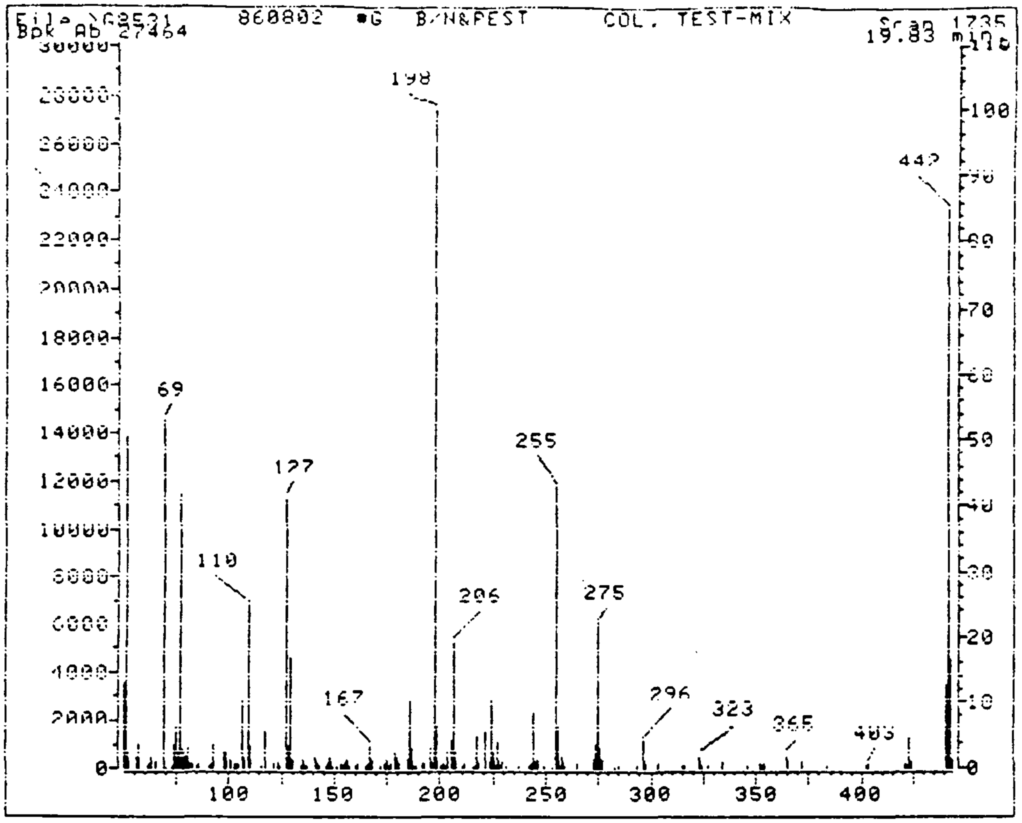

TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: S. Lagoumuch
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0131	RESOURCE ENGINEERING	RES27514	SDB-7-46-48	860719	0140	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	73	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	73	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4090	0[a]
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	97	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	390	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	73	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	73	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	97	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	73	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	73	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4090	32[a]
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	390	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	73	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	390	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	85	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	73	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0131	RESOURCE ENGINEERING	RES27514	SDB-7-46-48	860719	0140	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	73	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	35	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	62	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	85	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	62	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	73	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	73	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	210	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	73	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	73	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0131	RESOURCE ENGINEERING	RES27514	SDB-7-46-48	86071	0140	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	89	20	140
2-Fluorobiphenyl	50	76	20	140
Terphenyl-D14	50	83	20	150

* IFB EPA Control Limits

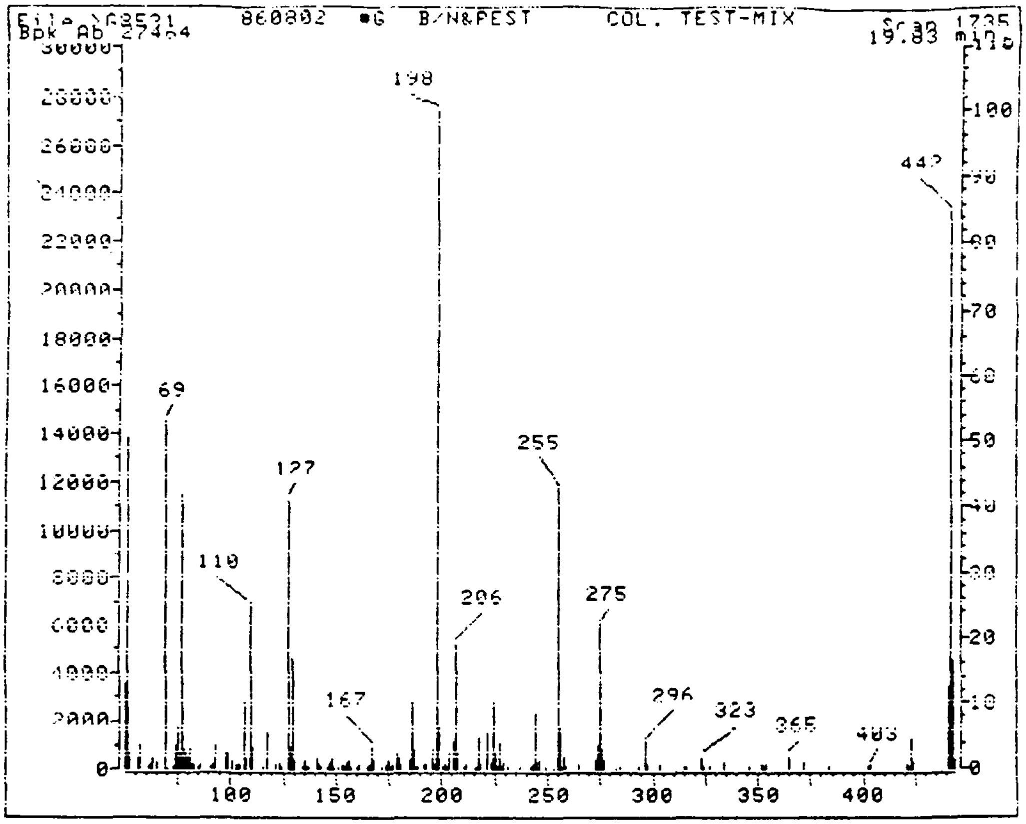


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slaponuch
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CP 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0133	RESOURCE ENGINEERING	RES27514	SDB-7-56-58	860719	0150	

NPDES Number	Compound	Results: Sample Concen ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	75	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	75	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4090	0[A]
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	99	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	ND	400	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	75	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	75	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	99	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	660	ND	ND	ND	0	-	ND	4090	32[A]
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	400	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	75	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	400	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	75	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0133	RESOURCE ENGINEERING	RES27514	SDB-7-56-58	860719	0150	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	64	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	64	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	75	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	75	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	210	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	75	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0133	RESOURCE ENGINEERING	RES27514	SDB-7-56-58	86071	0150	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	102	20	140
2-Fluorobiphenyl	50	82	20	140
Terphenyl-D14	50	91	20	150

* IFB EPA Control Limits

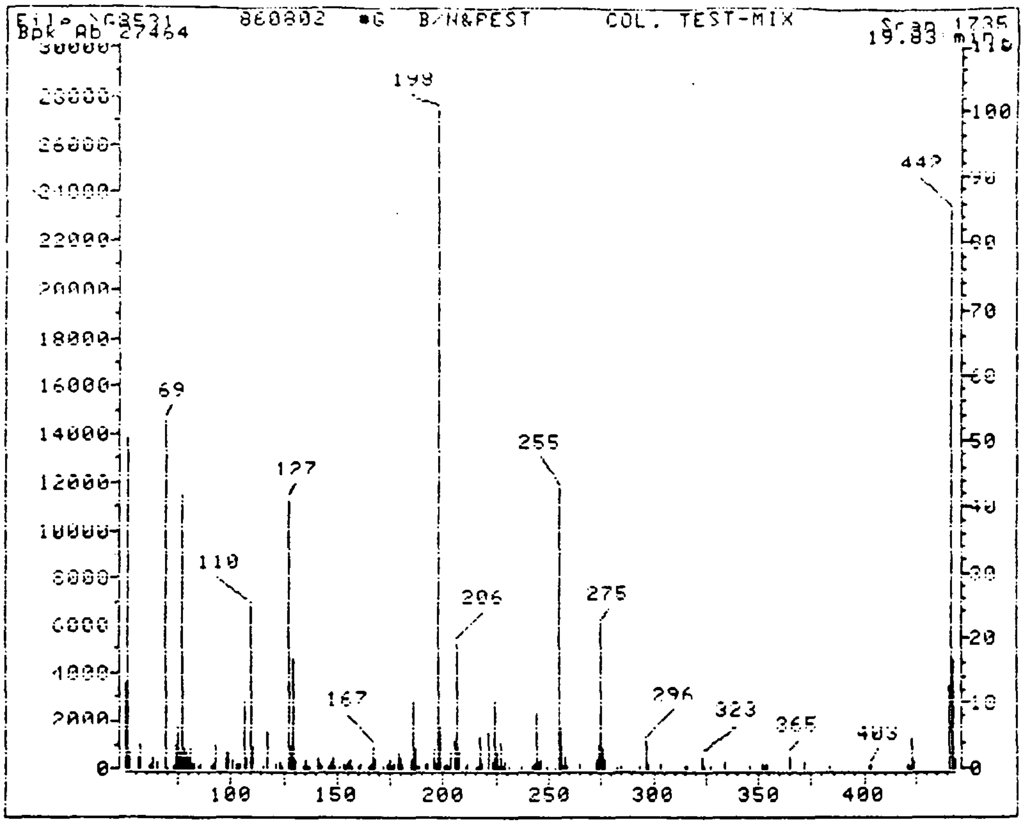


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Stagonuch
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds. N0131 - N0135, N0138 - N0143

CP 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0142	RESOURCE ENGINEERING	RES27514	SDB-8-26-28	860720		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	78	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	78	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4090	0a
5B	Benzo(a)anthracene	ND	320	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	410	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	220	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	ND	410	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	78	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	78	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	410	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	78	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	78	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	670	ND	ND	ND	0	-	ND	4090	32a
24B	Diethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	410	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	78	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	410	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	410	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	90	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	78	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0142	RESOURCE ENGINEERING	RES27514	SDB-8-26-28	860720		

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	78	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	37	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	410	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	65	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	90	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	BMDL	65	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	78	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	410	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	410	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	78	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	220	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	78	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	78	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0142	RESOURCE ENGINEERING	RES27514	SDB-8-26-28	86072		0

Compound	Amount added	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	95	20	140
2-Fluorobiphenyl	50	80	20	140
Terphenyl-D14	50	88	20	150

* IFB EPA Control Limits

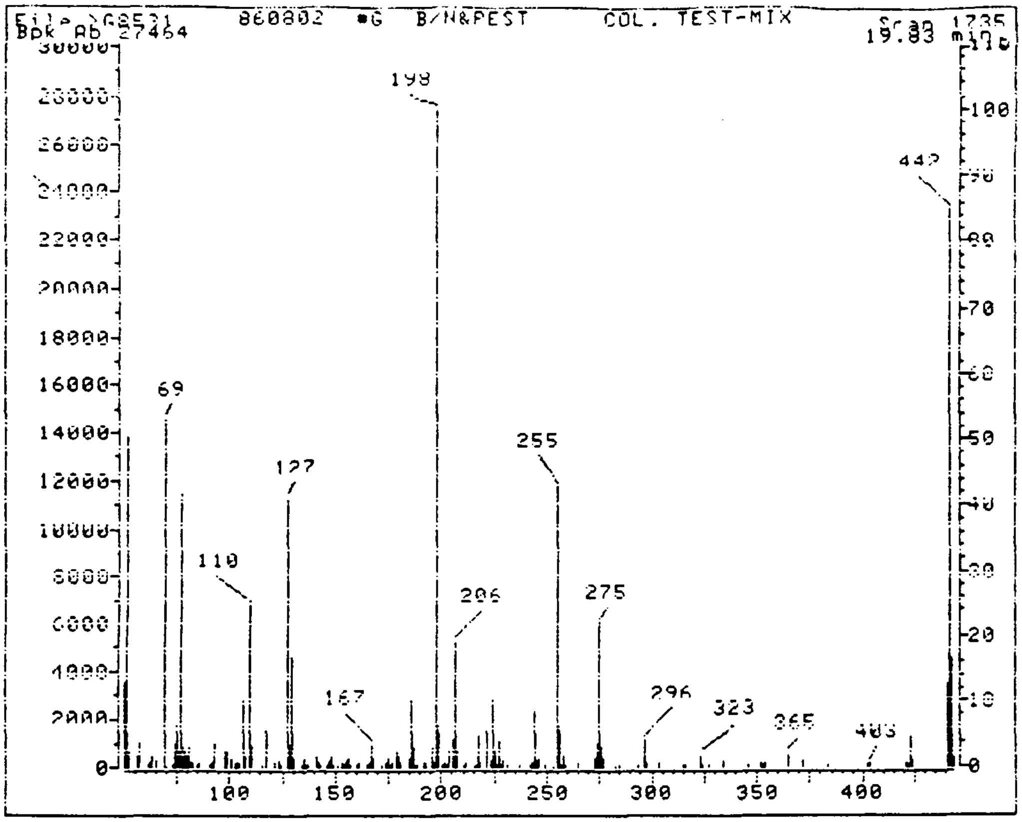


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Sraponuch

Injection Time: 15:34 Processor: Mita Mukherjee

Run No: >G8531 QC Batch: QB5399

Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CP 8/4/16

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0138	RESOURCE ENGINEERING	RES27514	SDB-8-32-34	860720	2130	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov.	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	ND	80	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	150	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	80	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4090	0[a]
5B	Benzo(a)anthracene	ND	330	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	420	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	150	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	220	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	240	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	240	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	420	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	80	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	80	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	180	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	420	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	80	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	80	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	690	ND	ND	ND	0	-	ND	4090	32[a]
24B	Diethyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	420	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	240	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	80	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	BMDL	420	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	420	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	92	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	80	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG. 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0138	RESOURCE ENGINEERING	RES27514	SDB-8-32-34	860720	2130	

		Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
NPDES Number	Compound	Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	80	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	38	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	420	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	67	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	200	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	92	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	67	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	80	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	420	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	420	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	80	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	230	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	80	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	80	ND	ND	ND	0	-	ND	4090	88

A Recovery normally variable using established methodology.

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0138	RESOURCE ENGINEERING	RES27514	SDB-8-32-34	86072	2130	0

Compound	Amount added E4, SPA	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	72	20	140
2-Fluorobiphenyl	50	77	20	140
Terphenyl-D14	50	81	20	150

* IFB EPA Control Limits

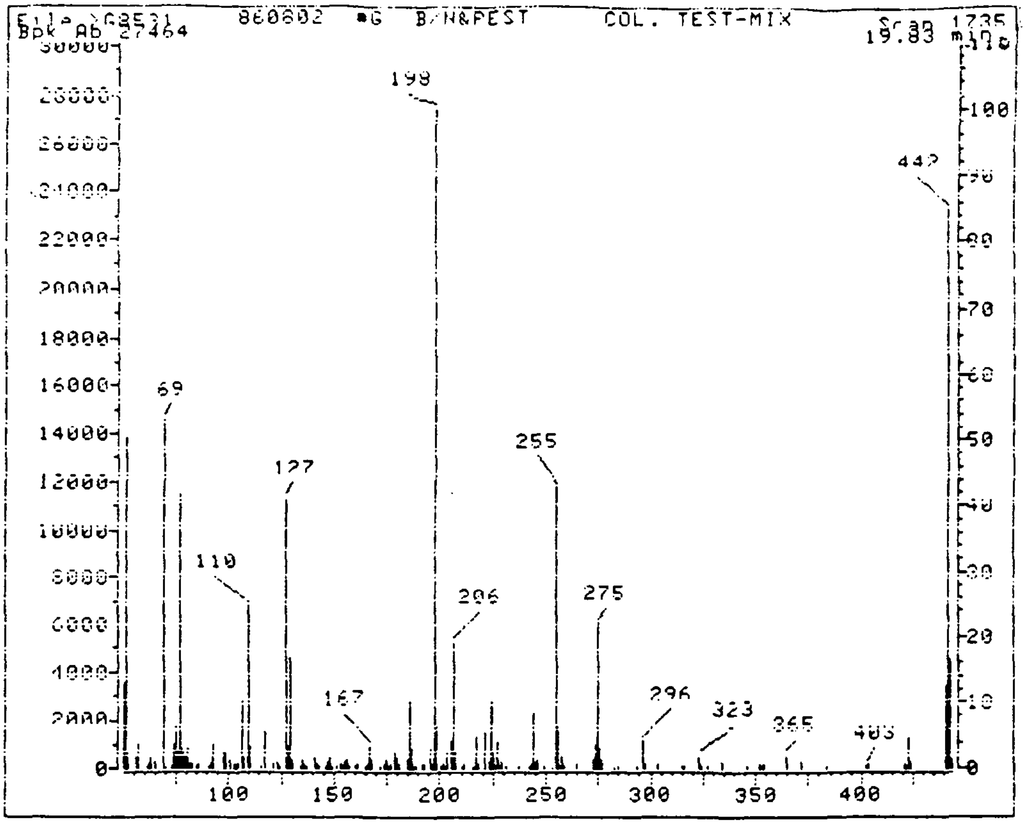


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [illegible signature]
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CD 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0139	RESOURCE ENGINEERING	RES27514	SDB-8-34-36	860720	2140	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	ND	81	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	150	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	81	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1900	ND	ND	ND	0	-	ND	4090	0[a]
5B	Benzo(a)anthracene	ND	330	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	110	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	420	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	150	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	230	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	240	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	240	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	ND	420	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	81	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	81	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	180	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	110	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	420	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	190	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	700	ND	ND	ND	0	-	ND	4090	32[a]
24B	Diethyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	420	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	420	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	240	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	81	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	420	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	420	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	93	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	BMDL	81	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0139	RESOURCE ENGINEERING	RES27514	SDB-8-34-36	860720	2140	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	148	81	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	3750	38	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	420	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	102	68	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	200	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	93	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	77.0	68	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	81	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	420	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	420	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	81	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	BMDL	230	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	81	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4090	88

A Recovery normally variable using established methodology.

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0139	RESOURCE ENGINEERING	RES27514	SDB-8-34-36	86072	2140	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	82	20	140
2-Fluorobiphenyl	50	71	20	140
Terphenyl-D14	50	78	20	150

* IFB EPA Control Limits

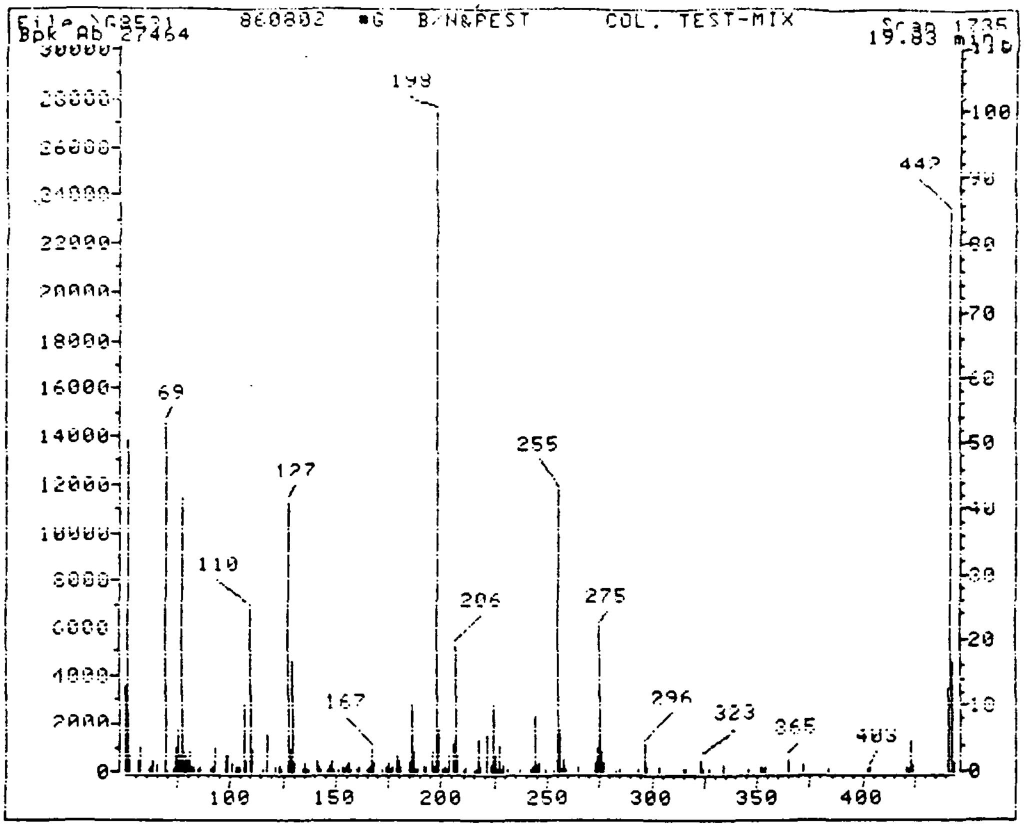


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slaponick
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138-N014

CP 8/4/16

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0140	RESOURCE ENGINEERING	RES27514	SDB-8-48-50	860720	2210	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	75	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	75	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4090	0A
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	99	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	ND	390	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	75	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	75	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	99	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	650	ND	ND	ND	0	-	ND	4090	32A
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	390	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	75	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	390	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	75	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0140	RESOURCE ENGINEERING	RES27514	SDB-8-48-50	860720	2210	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	63	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	63	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	75	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	75	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	210	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	75	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0140	RESOURCE ENGINEERING	RES27514	SDB-8-48-50	86072	2210	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	89	20	140
2-Fluorobiphenyl	50	80	20	140
Terphenyl-D14	50	83	20	150

* IFB EPA Control Limits

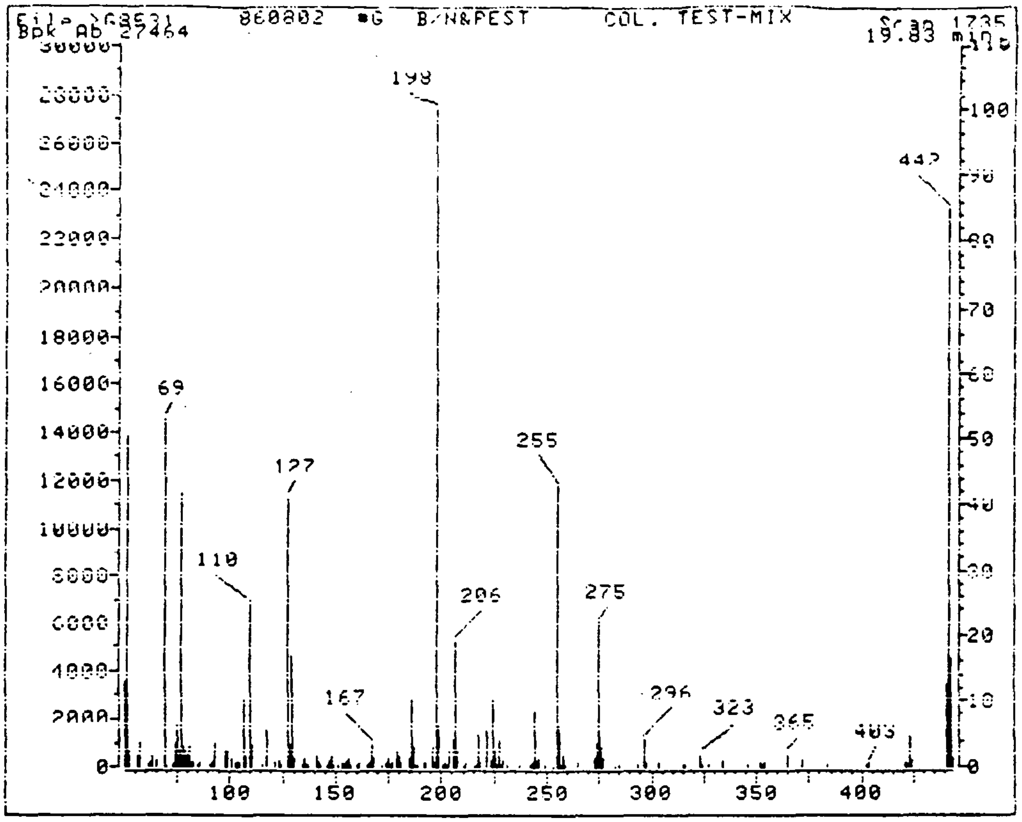


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86　　Analyst: Slagonich
Injection Time: 15:34　　Processor: Mita Mukherjee
Run No: >G8531　　QC Batch: QB5399
Spectrun No: 1735　　Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CP 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG. 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0141	RESOURCE ENGINEERING	RES27514	SDB-8-54-56	860720	2225	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	77	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	77	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4090	0R
5B	Benzo(a)anthracene	ND	320	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	410	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	220	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	410	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	77	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	77	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	410	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	670	ND	ND	ND	0	-	ND	4090	32R
24B	Diethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	410	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	77	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	410	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	410	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	90	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	77	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0141	RESOURCE ENGINEERING	RES27514	SDB-8-54-56	860720	2225	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	ND	37	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	410	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	65	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	90	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	65	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	77	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	410	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	410	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	77	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	ND	220	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	77	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 3, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0141	RESOURCE ENGINEERING	RES27514	SDB-8-54-56	86072	2225	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	94	20	140
2-Fluorobiphenyl	50	79	20	140
Terphenyl-D14	50	89	20	150

* IFB EPA Control Limits

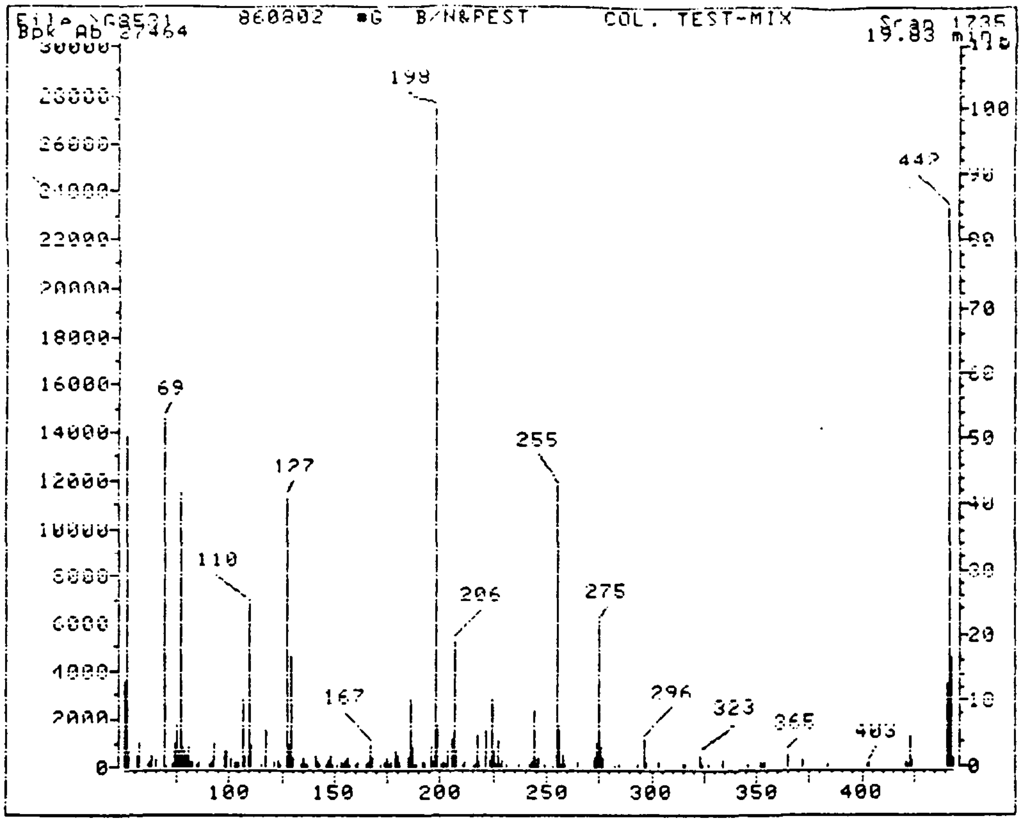


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86　Analyst: [signature]
Injection Time: 15:34　Processor: Mita Mukherjee
Run No: >G8531　QC Batch: QB5399
Spectrun No: 1735　Samples: Calib. Stds, N0131-N0135, N0138-N014[illegible]

CP 8/14/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1252	RESOURCE ENGINEERING	RES27514	SDB-9-32-34	860721	0140	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	209	74	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	74	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	78
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	97	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	ND	390	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	74	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	74	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	97	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	390	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	74	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	390	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	98.7	85	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	245	74	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1252	RESOURCE ENGINEERING	RES27514	SDB-9-32-34	860721	0140	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	124	74	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	3360	35	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	62	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	85	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	229	62	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	74	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	74	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	542	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	81.4	74	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1252	RESOURCE ENGINEERING	RES27514	SDB-9-32-34	86072	0140	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	103	23	120
2-Fluorobiphenyl	50	93	30	115
Terphenyl-D14	50	106	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

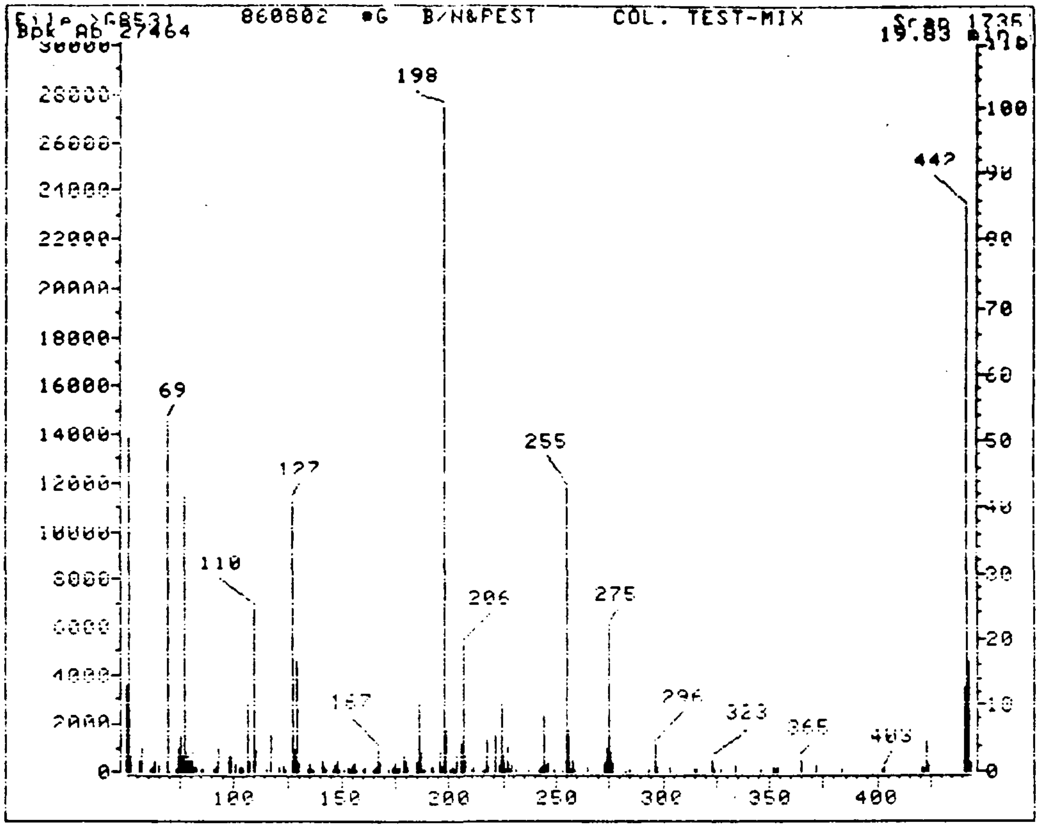


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slaughter
Injection Time: 15:34 Processor: Tom Kusowicz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1250	RESOURCE ENGINEERING	RES27514	SDB-9-40-42	860721	0200	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	77	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	77	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	4040	7[B]
5B	Benzo(a)anthracene	ND	320	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	410	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	410	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	77	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	410	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	77	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	410	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	670	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	410	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	410	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	77	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	410	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	410	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	89	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	77	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1250	RESOURCE ENGINEERING	RES27514	SDB-9-40-42	860721	0200	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	77	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	410	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	65	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	89	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	254	65	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	77	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	410	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	410	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	77	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	220	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	77	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	77	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1250	RESOURCE ENGINEERING	RES27514	SDB-9-40-42	86072	0200	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	109	23	120
2-Fluorobiphenyl	50	91	30	115
Terphenyl-D14	50	91	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

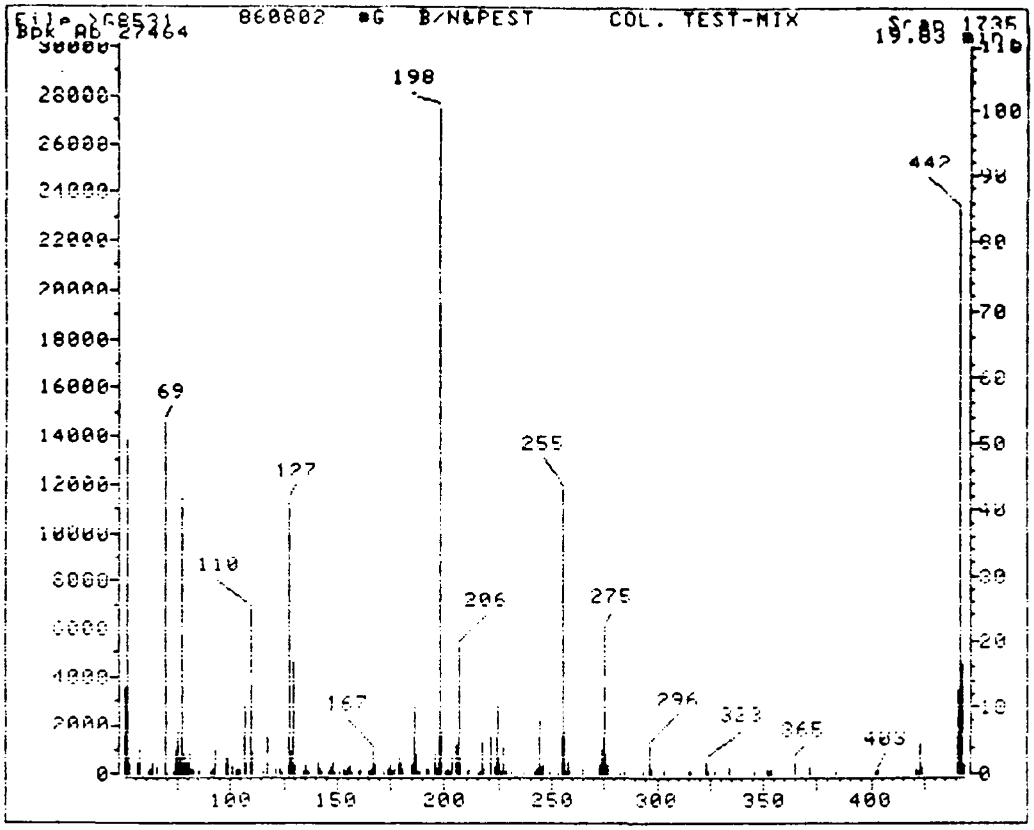


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [signature]
Injection Time: 15:34 Processor: Tom Kusowicz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

B 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1251	RESOURCE ENGINEERING	RES27514	SDB-9-46-48	860721	0210	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[a]	QC Replicate: Second ug/kg[a]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	141000	830	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	2970	1500	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	12600	830	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	19000	ND	ND	ND	0	-	ND	4040	70
5B	Benzo(a)anthracene	13100	3400	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	2540	1100	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	4970	4400	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	3340	1800	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	5110	1500	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	2300	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	2500	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	2500	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	ND	4400	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	830	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	4400	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	830	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	1800	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	14600	1100	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	BMDL	4400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	959	830	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	959	830	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	BMDL	1900	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	7200	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	4400	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	4400	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	4400	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	2500	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	830	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	4400	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	4400	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	193000	960	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	116000	830	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1251	RESOURCE ENGINEERING	RES27514	SDB-9-46-48	860721	0210	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	207000	830	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	529000	390	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	4670	4400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	559000	700	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	2730	2000	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	960	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	318000	700	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	830	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	4400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	4400	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	830	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	259000	2400	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	167000	830	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	289000	830	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

August 10, 1986

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1251						

Compound	Amount Added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	127 ***	23	120
2-Fluorobiphenyl	50	51 ****	30	115
Terphenyl-D14	50	92	18	137
PESTICIDE/PCB FRACTION (GC/MS)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits.
** Advisory Limits Only.
*** Recovery variable due to sample matrix interference.
**** Reported from 1:50 Dilution.

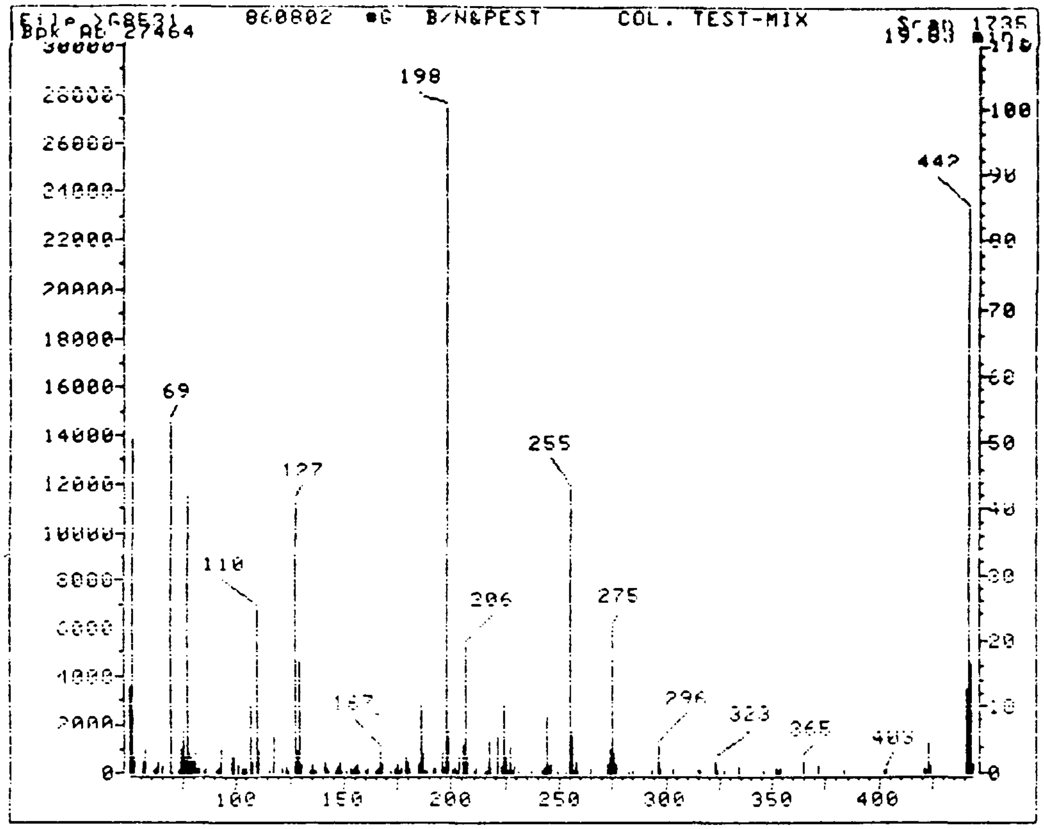


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slappnuch
Injection Time: 15:34 Processor: Tom Kusowicz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

B 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1253	RESOURCE ENGINEERING	RES27514	SDB-9-54-56	860721	0230	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	BMDL	81	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	150	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	81	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1900	ND	ND	ND	0	-	ND	4040	7[B]
5B	Benzo(a)anthracene	ND	330	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	110	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	430	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	180	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	150	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	230	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	240	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	240	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	430	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	81	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	430	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	81	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	180	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	110	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	430	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	190	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	710	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	430	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	430	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	430	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	240	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	81	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	430	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	430	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	BMDL	94	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	BMDL	81	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1253	RESOURCE ENGINEERING	RES27514	SDB-9-54-56	860721	0230	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	130	81	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	2470	39	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	430	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	128	68	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	200	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	94	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	68	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	81	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	430	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	430	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	81	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	BMDL	230	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	BMDL	81	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	81	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 5, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N1253	RESOURCE ENGINEERING	RES27514	SDB-9-54-56	86072	0230	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	78	23	120
2-Fluorobiphenyl	50	72	30	115
Terphenyl-D14	50	100	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

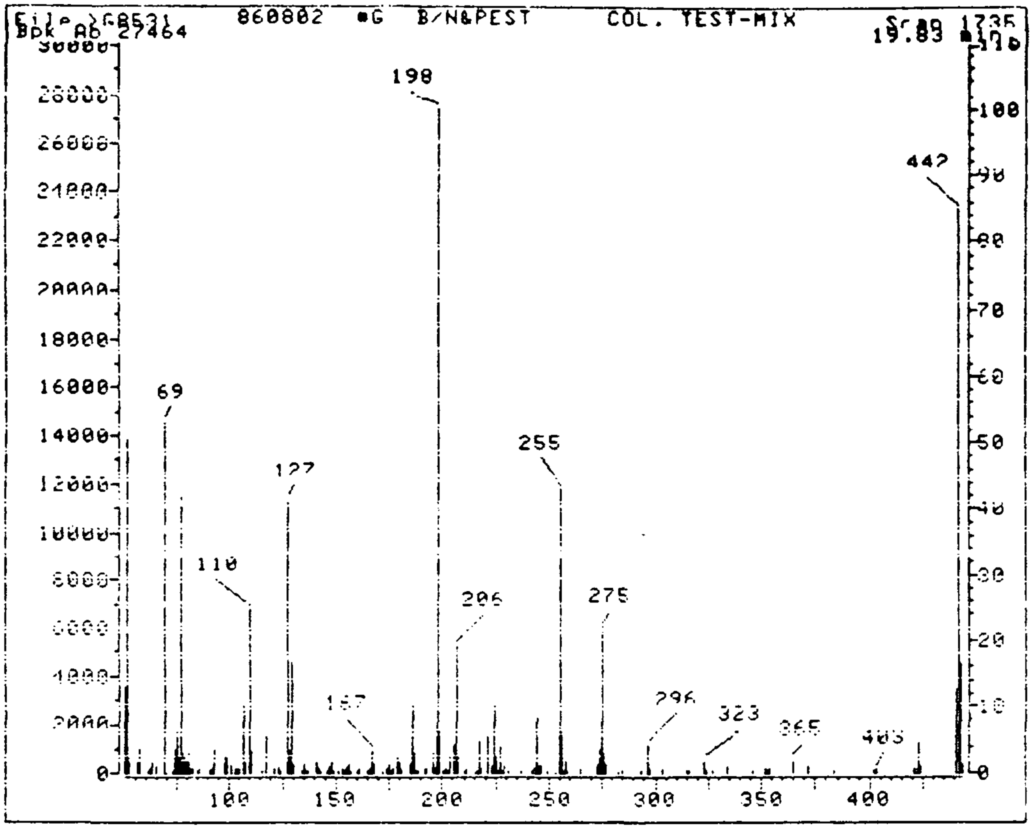


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slappnuch
Injection Time: 15:34 Processor: Tom Kusowicz
Run No: >G8531 QC Batch: QB5395
Spectrun No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

KJ 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0147	RESOURCE ENGINEERING	RES27514	SDB-10-2830	860721	2125	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[a]	QC Replicate: Second ug/kg[a]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	84	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	160	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	84	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	2000	ND	ND	ND	0	-	ND	4040	7[B]
5B	Benzo(a)anthracene	ND	350	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	110	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	440	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	180	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	160	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	240	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	250	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	250	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	ND	440	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	84	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	440	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	84	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	190	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	110	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	440	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	84	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	84	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	200	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	730	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	440	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	440	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	440	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	250	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	84	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	440	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	440	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	98	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	84	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0147	RESOURCE ENGINEERING	RES27514	SDB-10-2830	860721	2125	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	BMDL	84	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	481	40	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	440	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	71	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	210	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	98	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	BMDL	71	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	84	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	440	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	440	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	84	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	BMDL	240	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	84	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	84	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0147	RESOURCE ENGINEERING	RES27514	SDB-10-2830	86072	2125	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	97	23	120
2-Fluorobiphenyl	50	88	30	115
Terphenyl-D14	50	91	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

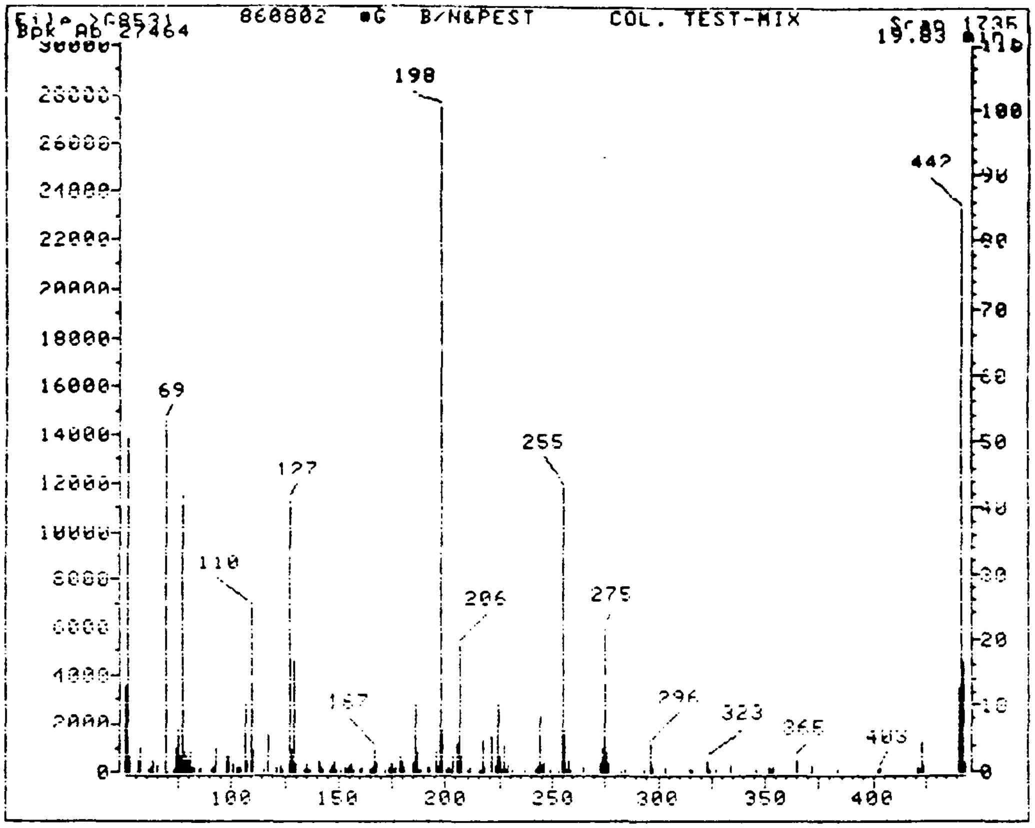


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.46	50.46	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [illegible]
Injection Time: 15:34 Processor: Tom Kasowitz
Run No: >G8531 QC Batch: QB5395
Spectrun No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

[illegible] 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0143	RESOURCE ENGINEERING	RES27514	SDB-10-3436	860721	2120	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	74	ND	ND	ND	0	-	ND	4090	94
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4090	93
3B	Anthracene	ND	74	ND	ND	ND	0	-	ND	4090	94
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4090	0[a]
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4090	85
6B	Benzo(a)pyrene	ND	97	ND	ND	ND	0	-	ND	4090	70
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4090	120
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4090	80
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4090	95
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4090	90
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4090	86
13B	bis(2-Ethylhexyl)phthalate	BMDL	390	ND	ND	ND	0	-	39.9	4090	79
14B	4-Bromophenyl phenyl ether	ND	74	ND	ND	ND	0	-	ND	4090	96
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	85
16B	2-Chloronaphthalene	ND	74	ND	ND	ND	0	-	ND	4090	97
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4090	86
18B	Chrysene	ND	97	ND	ND	ND	0	-	ND	4090	95
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4090	86
21B	1,3-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4090	87
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4090	88
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4090	32[a]
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	83
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4090	88
26B	Di-n-butyl phthalate	BMDL	390	146	238	79.1	0	-	48.6	4090	94
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4090	77
28B	2,6-Dinitrotoluene	ND	74	ND	ND	ND	0	-	ND	4090	89
29B	Di-n-octyl phthalate	ND	390	ND	ND	ND	0	-	63.2	4090	71
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4090	85
31B	Fluoranthene	ND	85	ND	ND	ND	0	-	ND	4090	92
32B	Fluorene	ND	74	ND	ND	ND	0	-	ND	4090	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 4, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0143	RESOURCE ENGINEERING	RES27514	SDB-10-3436	860721	2120	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	BMDL	74	ND	ND	ND	0	-	ND	4090	98
34B	Hexachlorobutadiene	606	35	ND	ND	ND	0	-	ND	4090	94
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	62	ND	ND	ND	0	-	ND	4090	91
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	85	ND	ND	ND	0	-	ND	4090	86
39B	Naphthalene	ND	62	ND	ND	ND	0	-	ND	4090	90
40B	Nitrobenzene	ND	74	ND	ND	ND	0	-	ND	4090	81
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4090	93
43B	N-Nitrosodiphenylamine	ND	74	ND	ND	ND	0	-	ND	4090	78
44B	Phenanthrene	BMDL	210	ND	ND	ND	0	-	ND	4090	97
45B	Pyrene	ND	74	ND	ND	ND	0	-	ND	4090	92
46B	1,2,4-Trichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4090	88

R Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0143	RESOURCE ENGINEERING	RES27514	SDB-10-3436	86072	2120	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	-	-	50	160
p-Bromofluorobenzene	-	-	50	160
1,2-Dichloroethane-D4	-	-	50	160
ACID FRACTION				
Phenol-D5	-	-	20	140
2-Fluorophenol	-	-	20	140
2,4,6-Tribromophenol	-	-	10	140
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	91	20	140
2-Fluorobiphenyl	50	71	20	140
Terphenyl-D14	50	91	20	150

* IFB EPA Control Limits

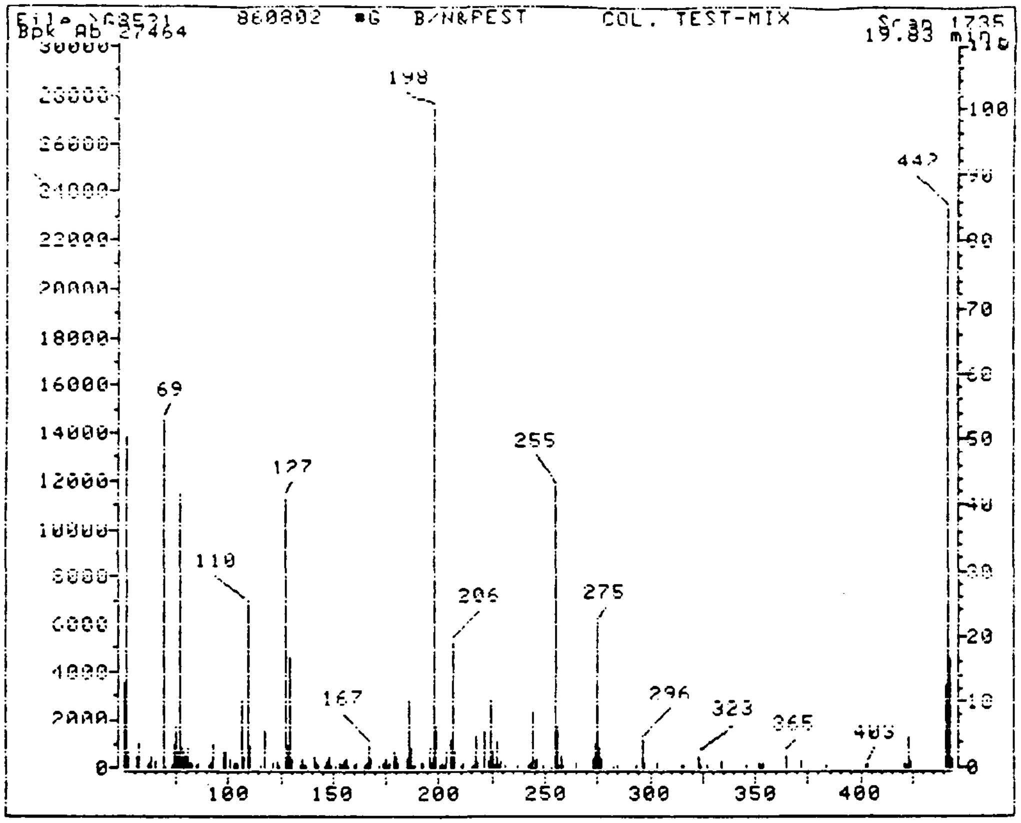


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Sragowich
Injection Time: 15:34 Processor: Mita Mukherjee
Run No: >G8531 QC Batch: QB5399
Spectrun No: 1735 Samples: Calib. Stds, N0131 - N0135, N0138 - N0143

CO 8/4/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0148	RESOURCE ENGINEERING	RES27514	SDB-10-4244	860721	2135	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1B	Acenaphthene	ND	74	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	74	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	78
5B	Benzo(a)anthracene	ND	300	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	97	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	1990	390	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	74	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	74	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	97	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	640	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	BMDL	390	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	74	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	BMDL	390	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	86	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	74	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0148	RESOURCE ENGINEERING	RES27514	SDB-10-4244	860721	2135	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	35	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	62	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	86	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	62	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	74	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	74	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	74	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	74	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0148	RESOURCE ENGINEERING	RES27514	SDB-10-4244	86072	2135	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	103	23	120
2-Fluorobiphenyl	50	89	30	115
Terphenyl-D14	50	99	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

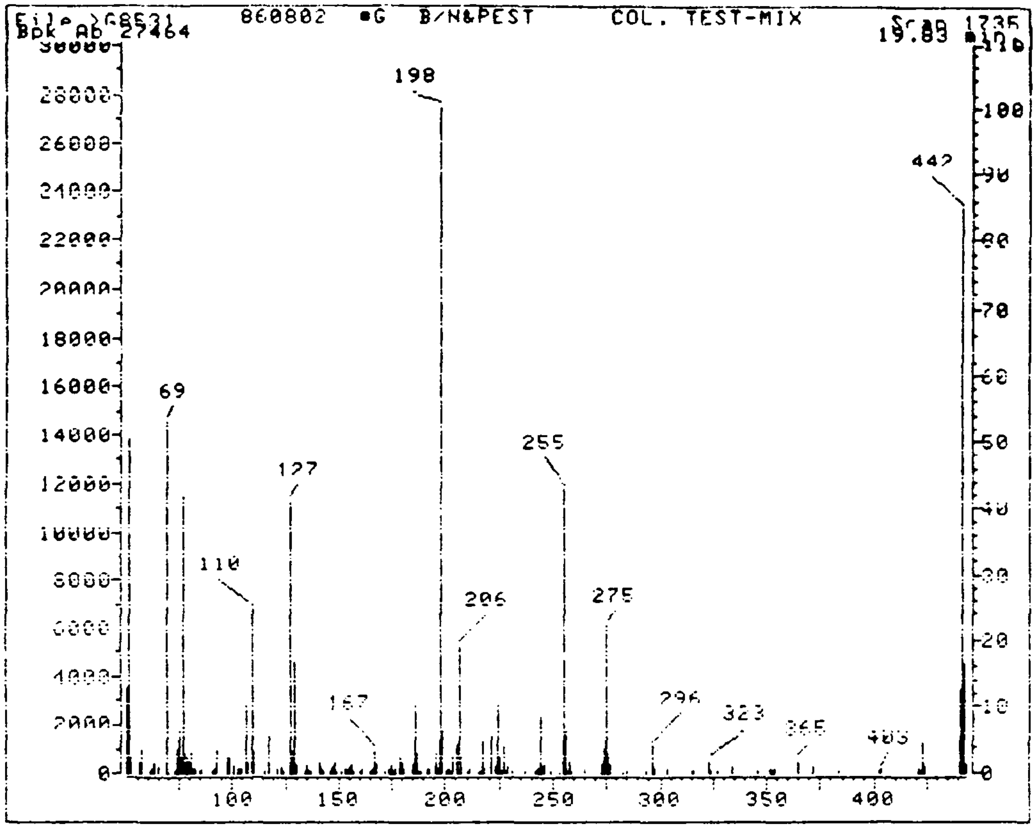


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.24	.24	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: [signature]
Injection Time: 15:34 Processor: Tom Kusowitz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 Dil) N1252-N1253

8/8/86

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0146	RESOURCE ENGINEERING	RES27514	SDB-10-5052	860721	2150	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[a]	Second ug/kg[a]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	ND	75	ND	ND	ND	0	-	ND	4040	92
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	4040	89
3B	Anthracene	ND	75	ND	ND	BMDL	0	-	ND	4040	93
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	4040	78
5B	Benzo(a)anthracene	ND	310	ND	ND	ND	0	-	ND	4040	91
6B	Benzo(a)pyrene	ND	98	ND	ND	ND	0	-	ND	4040	89
7B	Benzo(b)fluoranthene	ND	390	ND	ND	ND	0	-	ND	4040	79
8B	Benzo(ghi)perylene	ND	160	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	4040	102
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	4040	101
11B	bis(2-Chloroethyl) ether	ND	220	ND	ND	ND	0	-	ND	4040	93
12B	bis(2-Chloroisopropyl)ether	ND	220	ND	ND	ND	0	-	ND	4040	97
13B	bis(2-Ethylhexyl)phthalate	BMDL	390	60.8	ND	BMDL	0	-	159	4040	81
14B	4-Bromophenyl phenyl ether	ND	75	ND	ND	ND	0	-	ND	4040	92
15B	Butyl benzyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	93
16B	2-Chloronaphthalene	ND	75	ND	ND	ND	0	-	ND	4040	93
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	4040	88
18B	Chrysene	ND	98	ND	ND	ND	0	-	ND	4040	83
19B	Dibenzo(a,h)anthracene	ND	390	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	90
21B	1,3-Dichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	88
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	4040	87
23B	3,3'-Dichlorobenzidine	ND	650	ND	ND	ND	0	-	ND	4040	56
24B	Diethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	95
25B	Dimethyl phthalate	ND	390	ND	ND	ND	0	-	ND	4040	96
26B	Di-n-butyl phthalate	ND	390	29.2	61.6	BMDL	0	-	151	4040	97
27B	2,4-Dinitrotoluene	ND	220	ND	ND	ND	0	-	ND	4040	98
28B	2,6-Dinitrotoluene	ND	75	ND	ND	ND	0	-	ND	4040	99
29B	Di-n-octyl phthalate	ND	390	43.7	ND	ND	0	-	ND	4040	83
30B	1,2-Diphenylhydrazine	ND	390	ND	ND	ND	0	-	ND	4040	91
31B	Fluoranthene	ND	87	ND	ND	ND	0	-	ND	4040	90
32B	Fluorene	ND	75	ND	ND	ND	0	-	ND	4040	90

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS – GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0146	RESOURCE ENGINEERING	RES27514	SDB-10-5052	860721	2150	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	96
34B	Hexachlorobutadiene	ND	35	ND	ND	ND	0	-	ND	4040	87
35B	Hexachlorocyclopentadiene	ND	390	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	63	ND	ND	ND	0	-	ND	4040	76
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	87	ND	60.1	ND	0	-	ND	4040	89
39B	Naphthalene	ND	63	254	246	ND	0	-	ND	4040	88
40B	Nitrobenzene	ND	75	ND	ND	ND	0	-	ND	4040	89
41B	N-Nitrosodimethylamine	ND	390	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	390	ND	ND	ND	0	-	ND	4040	96
43B	N-Nitrosodiphenylamine	ND	75	ND	ND	ND	0	-	ND	4040	88
44B	Phenanthrene	ND	210	ND	ND	BMDL	0	-	ND	4040	98
45B	Pyrene	ND	75	ND	ND	ND	0	-	ND	4040	89
46B	1,2,4-Trichlorobenzene	ND	75	ND	ND	ND	0	-	ND	4040	87

A Results variable due to Non-Homogenous sample matrix.

B Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0146	RESOURCE ENGINEERING	RES27514	SDB-10-5052	86072	2150	0

Compound	Amount added	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	99	23	120
2-Fluorobiphenyl	50	88	30	115
Terphenyl-D14	50	101	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

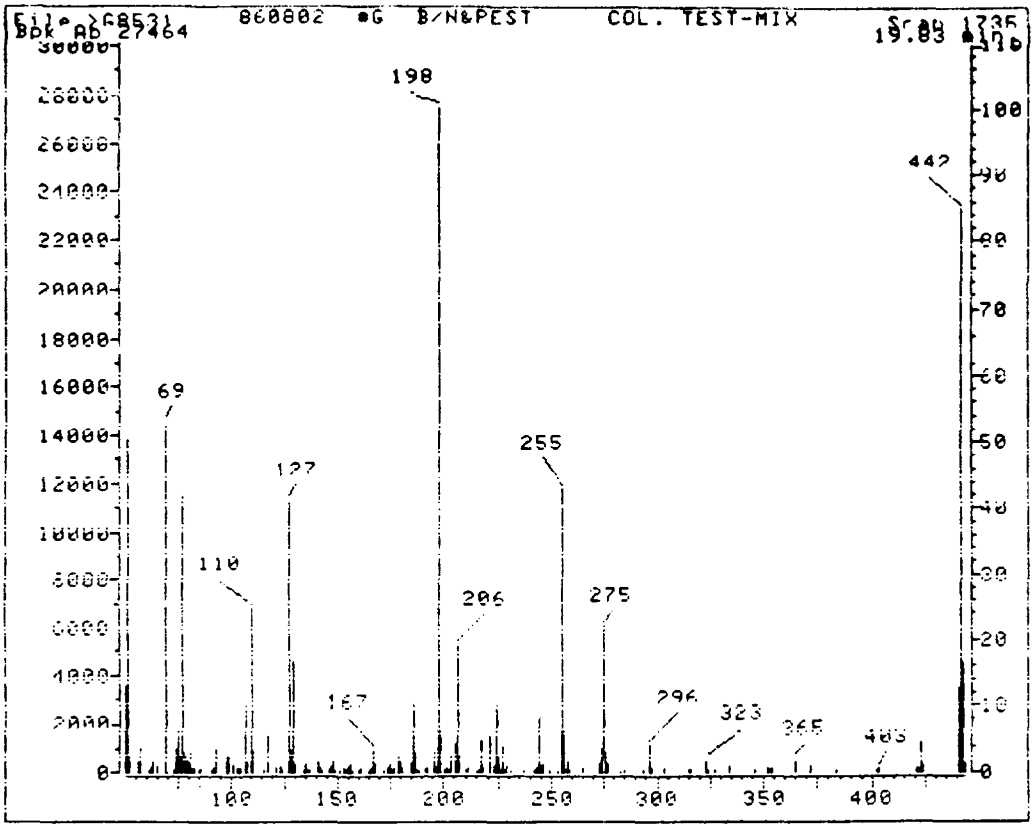


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.45	50.45	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	53.05	53.05	Ok
70	Less than 2% of mass 69	.24	.45	Ok
127	40-60% of mass 198	41.21	41.21	Ok
197	Less than 1% of mass 198	.74	.74	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.42	6.42	Ok
275	10-30% of mass 198	22.04	22.04	Ok
365	Greater than 1% of mass 198	2.02	2.02	Ok
441	0-100% of mass 443	12.57	77.21	Ok
442	Greater than 40% of mass 198	84.94	84.94	Ok
443	17-23% of mass 442	16.28	19.17	Ok

Injection Date: 08/02/86 Analyst: Slaughter
Injection Time: 15:34 Processor: Tom Kusowicz
Run No: >G8531 QC Batch: QB5395
Spectrum No: 1735 Samples: N0146-N0152, N0154-N0158, N1250, N1251 (1:10 DIL) N1252-N1253

KB 8/8/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 20, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0144	RESOURCE ENGINEERING	RES27514	SDB-10-5658	860721	2205	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3330	88
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3330	85
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3330	77
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3330	0a
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3330	79
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3330	79
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3330	75
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3330	93
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3330	102
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3330	168
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3330	108
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	559	ND	0	-	ND	3330	248a
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3330	89
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3330	92
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3330	86
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3330	96
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3330	89
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3330	119
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3330	78
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3330	90
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3330	0a
24B	Diethyl phthalate	ND	330	77.3	43.1	ND	0	-	57.3	3330	102
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3330	101
26B	Di-n-butyl phthalate	ND	330	ND	ND	415	0	-	ND	3330	93
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3330	100
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3330	95
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3330	93
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3330	99
31B	Fluoranthene	ND	73	ND	61.2	ND	0	-	74.4	3330	62
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3330	86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 20, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0144	RESOURCE ENGINEERING	RES27514	SDB-10-5658	860721	2205	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3330	96
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3330	74
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3330	33
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3330	96
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3330	84
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3330	71
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3330	104
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3330	107
44B	Phenanthrene	ND	180	80.5	40.6	ND	0	-	62.9	3330	89
45B	Pyrene	ND	63	ND	ND	ND	0	-	57.3	3330	67
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3330	75

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0144	RESOURCE ENGINEERING	RES27514	SDB-10-5658	86072	2205	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	75	23	120
2-Fluorobiphenyl	50	76	30	115
Terphenyl-D14	50	80	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

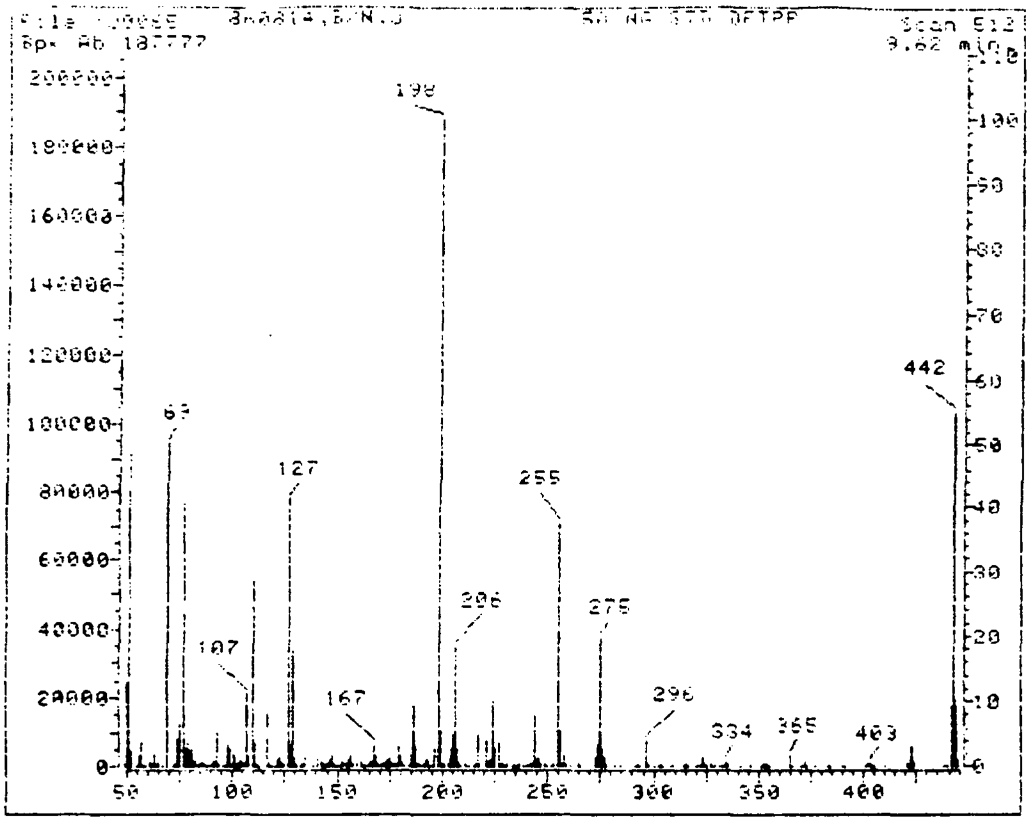


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	48.43	48.43	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	50.28	50.28	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	41.57	41.57	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	5.67	5.67	Ok
275	10-30% of mass 198	20.09	20.09	Ok
365	Greater than 1% of mass 198	1.75	1.75	Ok
441	0-100% of mass 443	9.62	96.70	Ok
442	Greater than 40% of mass 198	54.98	54.98	Ok
443	17-23% of mass 442	9.95	18.10	Ok

Injection Date: 08/14/86 Analyst: K. Valentin
Injection Time: 16:31 Processor: Mita Mukherjee
Run No: >30665 QC Batch: QB5418
Spectrum No: 512 Samples: Calib. Stds. M9054 – M9068, M9684 – M9687, N0144

VS 8/19/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 31, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0174	RESOURCE ENGINEERING	RES27514	SP1033-5	860729	2230	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/l	MDL ug/l A	First ug/l	Second ug/l	Blank Data ug/l	Concen Added ug/l	% Recov B	Unspiked Sample ug/l	Concen Added ug/l	% Recov B
1B	Acenaphthene	ND	190000	440000 1	620000	-	-	-	-	-	-
2B	Acenaphthylene	ND	180000	55800	34700	-	-	-	-	-	-
3B	Anthracene	ND	190000	460000 2	090000	-	-	-	-	-	-
4B	Benzidine	ND	2200000	ND	ND	-	-	-	-	-	-
5B	Benzo(a)anthracene	ND	390000	946000	608000	-	-	-	-	-	-
6B	Benzo(a)pyrene	ND	130000	316000	179000	-	-	-	-	-	-
7B	Benzo(b)fluoranthene	ND	500000	777000	482000	-	-	-	-	-	-
8B	Benzo(ghi)perylene	ND	210000	ND	ND	-	-	-	-	-	-
9B	Benzo(k)fluoranthene	ND	180000	ND	ND	-	-	-	-	-	-
10B	bis(2-Chloroethoxy)methane	ND	270000	ND	ND	-	-	-	-	-	-
11B	bis(2-Chloroethyl) ether	ND	290000	ND	ND	-	-	-	-	-	-
12B	bis(2-Chloroisopropyl)ether	ND	570000	ND	ND	-	-	-	-	-	-
13B	bis(2-Ethylhexyl)phthalate	ND	500000	ND	ND	-	-	-	-	-	-
14B	4-Bromophenyl phenyl ether	ND	95000	ND	ND	-	-	-	-	-	-
15B	Butyl benzyl phthalate	ND	500000	ND	ND	-	-	-	-	-	-
16B	2-Chloronaphthalene	ND	95000	ND	ND	-	-	-	-	-	-
17B	4-Chlorophenyl phenyl ether	ND	210000	ND	ND	-	-	-	-	-	-
18B	Chrysene	ND	130000	080000	670000	-	-	-	-	-	-
19B	Dibenzo(a,h)anthracene	ND	500000	ND	ND	-	-	-	-	-	-
20B	1,2-Dichlorobenzene	ND	95000	ND	ND	-	-	-	-	-	-
21B	1,3-Dichlorobenzene	ND	95000	ND	ND	-	-	-	-	-	-
22B	1,4-Dichlorobenzene	ND	220000	ND	ND	-	-	-	-	-	-
23B	3,3'-Dichlorobenzidine	ND	830000	ND	ND	-	-	-	-	-	-
24B	Diethyl phthalate	ND	500000	ND	ND	-	-	-	-	-	-
25B	Dimethyl phthalate	ND	1000000	ND	ND	-	-	-	-	-	-
26B	Di-n-butyl phthalate	ND	500000	ND	ND	-	-	-	-	-	-
27B	2,4-Dinitrotoluene	ND	290000	ND	ND	-	-	-	-	-	-
28B	2,6-Dinitrotoluene	ND	95000	ND	ND	-	-	-	-	-	-
29B	Di-n-octyl phthalate	ND	500000	ND	ND	-	-	-	-	-	-
30B	1,2-Diphenylhydrazine	ND	500000	ND	ND	-	-	-	-	-	-
31B	Fluoranthene	ND	110000	440000 3	500000	-	-	-	-	-	-
32B	Fluorene	ND	190000	520000 2	360000	-	-	-	-	-	-

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 31, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0174	RESOURCE ENGINEERING	RES27514	SP1033-5	860729	2230	

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l A	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov B	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov B
33B	Hexachlorobenzene	ND	95000	ND	ND	-	-	-	-	-	-
34B	Hexachlorobutadiene	ND	45000	ND	ND	-	-	-	-	-	-
35B	Hexachlorocyclopentadiene	ND	500000	ND	ND	-	-	-	-	-	-
36B	Hexachloroethane	ND	80000	ND	ND	-	-	-	-	-	-
37B	Indeno(1,2,3-c,d)pyrene	ND	240000	ND	ND	-	-	-	-	-	-
38B	Isophorone	ND	110000	ND	ND	-	-	-	-	-	-
39B	Naphthalene	271000	80000	940000 1	220000	-	-	-	-	-	-
40B	Nitrobenzene	ND	95000	ND	ND	-	-	-	-	-	-
41B	N-Nitrosodimethylamine	ND	1000000	ND	ND	-	-	-	-	-	-
42B	N-Nitrosodi-n-propylamine	ND	500000	ND	ND	-	-	-	-	-	-
43B	N-Nitrosodiphenylamine	ND	190000	ND	ND	-	-	-	-	-	-
44B	Phenanthrene	BMDL	270000	400000 6	910000	-	-	-	-	-	-
45B	Pyrene	ND	95000	780000 2	090000	-	-	-	-	-	-
46B	1,2,4-Trichlorobenzene	ND	95000	ND	ND	-	-	-	-	-	-

A ETC established Method Detection Limit for this particular sample.

B Standard QA procedures not applicable to dilute and shoot analysis.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0175	RESOURCE ENGINEERING	RES27514	SP10323-25	860729	2350	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	134	63	ND	ND	ND	0	-	134	3120	80
2B	Acenaphthylene	BMDL	120	ND	ND	ND	0	-	74.4	3120	79
3B	Anthracene	108	63	ND	ND	ND	0	-	108	3120	71
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3120	0a
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3120	77
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3120	159
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3120	122
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3120	104
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3120	72
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3120	68
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3120	46
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	1550	BMDL	0	-	ND	3120	73
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3120	88
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	72
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3120	89
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3120	78
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3120	83
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3120	58
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3120	61
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3120	69
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3120	0a
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	74
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	75
26B	Di-n-butyl phthalate	BMDL	330	ND	40.4	BMDL	0	-	56.1	3120	77
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3120	69
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3120	69
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	97
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3120	75
31B	Fluoranthene	BMDL	73	ND	ND	ND	0	-	51.8	3120	35
32B	Fluorene	316	63	ND	ND	ND	0	-	316	3120	69

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0175	RESOURCE ENGINEERING	RES27514	SP10323-25	860729	2350	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3120	83
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3120	78
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3120	84
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3120	77
39B	Naphthalene	982	53	ND	ND	ND	0	-	982	3120	78
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3120	83
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3120	83
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3120	87
44B	Phenanthrene	765	180	ND	ND	ND	0	-	765	3120	76
45B	Pyrene	91.6	63	ND	ND	ND	0	-	91.6	3120	28
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3120	80

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

August 20, 1986

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0175						
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount Added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	92	23	120
2-Fluorobiphenyl	50	132***	30	115
Terphenyl-D14	50	54	18	137
PESTICIDE/PCB FRACTION (GC/MS)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits.
** Advisory Limits Only.
*** Recovery manually verified.

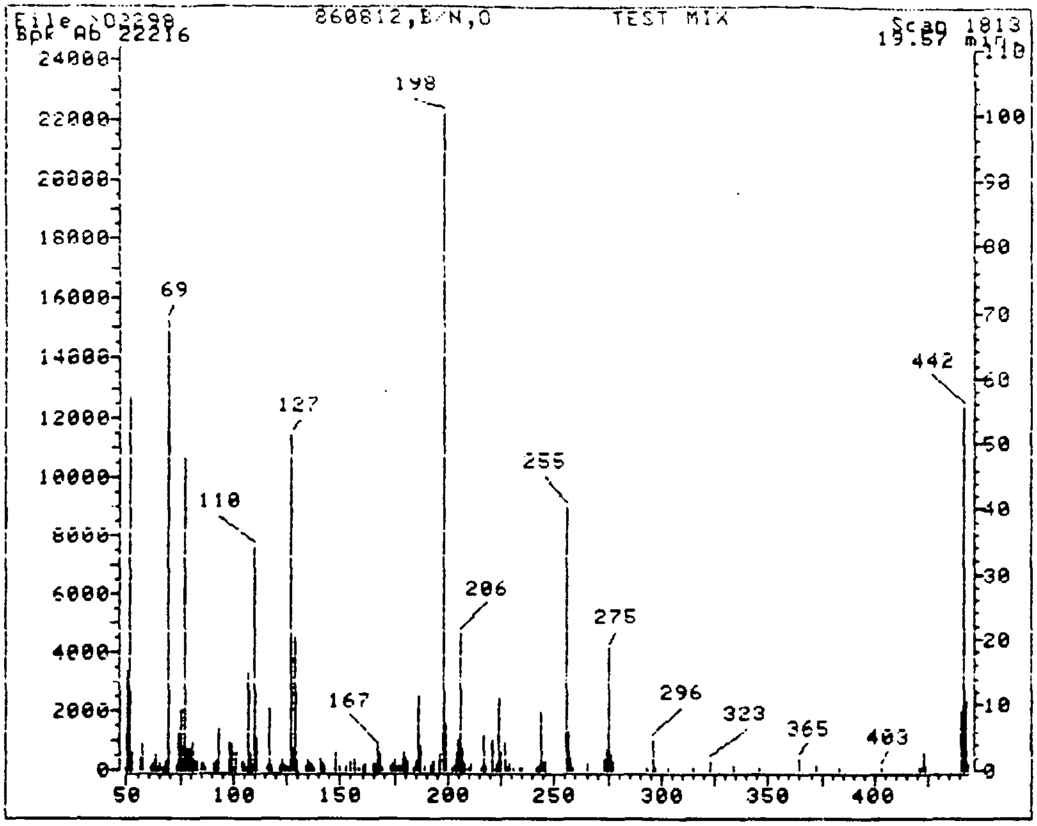


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	57.15	57.15	Ok
68	Less than 2% of mass 69	1.21	1.76	Ok
69	(reference only)	68.73	68.73	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	51.21	51.21	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	**Base peak, 100% relative abundance**	**100.00**	**100.00**	Ok
199	5-9% of mass 198	7.21	7.21	Ok
275	10-30% of mass 198	18.60	18.60	Ok
365	Greater than 1% of mass 198	1.85	1.85	Ok
441	0-100% of mass 443	8.64	84.28	Ok
442	Greater than 40% of mass 198	55.78	55.78	Ok
443	17-23% of mass 442	10.25	18.37	Ok

Injection Date: 08/12/86 Analyst: [illegible]
Injection Time: 16:31 Processor: Mita Mukherjee
Run No: >02298 QC Batch: QB5430
Spectrun No: 1813 Samples: N0173, N0173, ~~N0178~~, Calib. Std

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0178	RESOURCE ENGINEERING	RES27514	SP10328-30	860730	0045	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
1B	Acenaphthene	168	62	ND	ND	ND	0	-	134	3120	80
2B	Acenaphthylene	BMDL	110	ND	ND	ND	0	-	74.4	3120	79
3B	Anthracene	ND	62	ND	ND	ND	0	-	108	3120	71
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3120	0[B]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3120	77
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3120	159
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3120	122
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3120	104
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3120	72
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3120	68
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3120	46
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	1550	BMDL	0	-	ND	3120	73
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3120	88
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	72
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3120	89
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3120	78
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3120	83
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	58
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	61
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3120	69
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3120	0[B]
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	74
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	75
26B	Di-n-butyl phthalate	BMDL	330	ND	40.4	BMDL	0	-	56.1	3120	77
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3120	69
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3120	69
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	97
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3120	75
31B	Fluoranthene	BMDL	72	ND	ND	ND	0	-	51.8	3120	35
32B	Fluorene	246	62	ND	ND	ND	0	-	316	3120	69

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0178	RESOURCE ENGINEERING	RES27514	SP10328-30	860730	0045	

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg[A]	Second ug/kg[A]	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3120	78
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3120	84
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3120	77
39B	Naphthalene	927	52	ND	ND	ND	0	-	982	3120	78
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3120	83
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3120	87
44B	Phenanthrene	682	180	ND	ND	ND	0	-	765	3120	76
45B	Pyrene	ND	62	ND	ND	ND	0	-	91.6	3120	28
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	80

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0178	RESOURCE ENGINEERING	RES27514	SP10328-30	86073	0045	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	82	23	120
2-Fluorobiphenyl	50	84	30	115
Terphenyl-D14	50	73	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

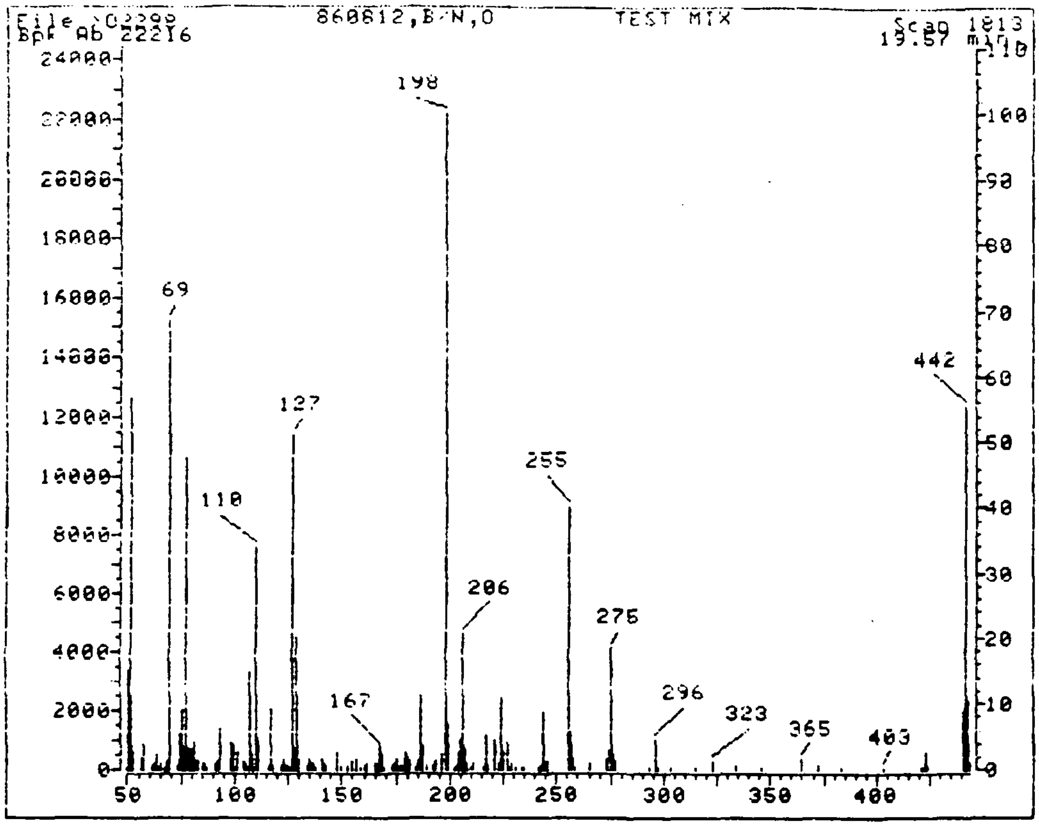


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	57.15	57.15	Ok
68	Less than 2% of mass 69	1.21	1.76	Ok
69	(reference only)	68.73	68.73	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	51.21	51.21	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.21	7.21	Ok
275	10-30% of mass 198	18.60	18.60	Ok
365	Greater than 1% of mass 198	1.85	1.85	Ok
441	0-100% of mass 443	8.64	84.28	Ok
442	Greater than 40% of mass 198	55.78	55.78	Ok
443	17-23% of mass 442	10.25	18.37	Ok

Injection Date: 08/12/86 Analyst: [illegible]
Injection Time: 16:31 Processor: [illegible]
Run No: >02298 QC Batch: QB5430
Spectrum No: 1813 Samples: N0173, N0173, ~~N0178~~, Calib. Std

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0176	RESOURCE ENGINEERING	RES27514	SP10338-40	860730	0115	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg A	QC Replicate: Second ug/kg A	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	BMDL	62	ND	ND	ND	0	-	134	3120	80
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	74.4	3120	79
3B	Anthracene	ND	62	ND	ND	ND	0	-	108	3120	71
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3120	0B
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3120	77
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3120	159
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3120	122
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3120	104
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3120	72
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3120	68
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3120	46
13B	bis(2-Ethylhexyl)phthalate	ND	320	ND	1550	BMDL	0	-	ND	3120	73
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3120	88
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	72
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3120	89
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3120	78
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3120	83
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	58
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	61
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3120	69
23B	3,3'-Dichlorobenzidine	ND	530	ND	ND	ND	0	-	ND	3120	0B
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	74
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	75
26B	Di-n-butyl phthalate	BMDL	320	ND	40.4	BMDL	0	-	56.1	3120	77
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3120	69
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3120	69
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	97
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3120	75
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	51.8	3120	35
32B	Fluorene	70.0	62	ND	ND	ND	0	-	316	3120	69

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0176	RESOURCE ENGINEERING	RES27514	SP10338-40	860730	0115	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3120	78
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3120	84
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3120	77
39B	Naphthalene	609	52	ND	ND	ND	0	-	982	3120	78
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3120	83
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3120	87
44B	Phenanthrene	BMDL	170	ND	ND	ND	0	-	765	3120	76
45B	Pyrene	ND	62	ND	ND	ND	0	-	91.6	3120	28
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	80

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 16, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0176	RESOURCE ENGINEERING	RES27514	SP10338-40	86073	0115	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	83	23	120
2-Fluorobiphenyl	50	98	30	115
Terphenyl-D14	50	100	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

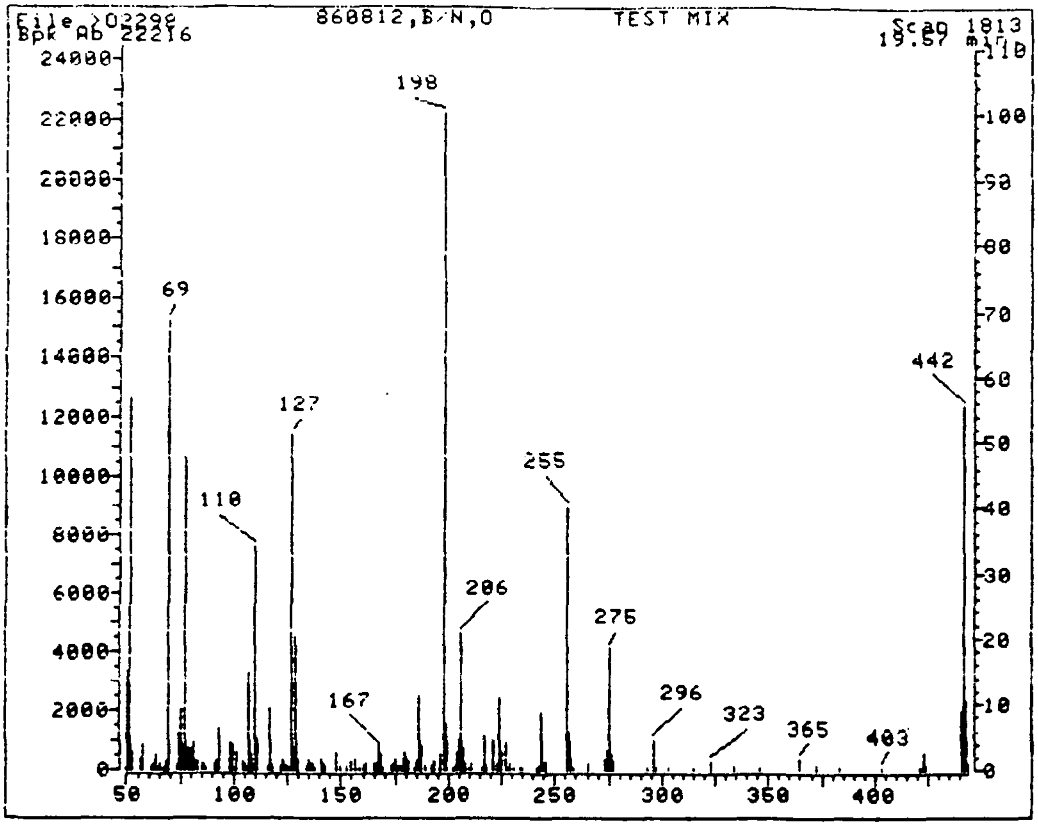


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	57.15	57.15	Ok
68	Less than 2% of mass 69	1.21	1.76	Ok
69	(reference only)	68.73	68.73	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	51.21	51.21	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.21	7.21	Ok
275	10-30% of mass 198	18.60	18.60	Ok
365	Greater than 1% of mass 198	1.85	1.85	Ok
441	0-100% of mass 443	8.64	84.28	Ok
442	Greater than 40% of mass 198	55.78	55.78	Ok
443	17-23% of mass 442	10.25	18.37	Ok

Injection Date: 08/12/86 Analyst: [illegible]
Injection Time: 16:31 Processor: [illegible]
Run No: >02298 QC Batch: QB5430
Spectrun No: 1813 Samples: N0173, N0173 ~~N0178~~,
Calib. Std

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0177	RESOURCE ENGINEERING	RES27514	SP10348-50	860730	0130	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	134	3120	80
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	74.4	3120	79
3B	Anthracene	ND	62	ND	ND	ND	0	-	108	3120	71
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3120	0[B]
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3120	77
6B	Benzo(a)pyrene	ND	82	ND	ND	ND	0	-	ND	3120	159
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3120	122
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3120	104
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3120	72
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3120	68
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3120	46
13B	bis(2-Ethylhexyl)phthalate	587	330	ND	1550	BMDL	0	-	ND	3120	73
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3120	88
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	72
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3120	89
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3120	78
18B	Chrysene	ND	82	ND	ND	ND	0	-	ND	3120	83
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	58
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	61
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3120	69
23B	3,3'-Dichlorobenzidine	ND	540	ND	ND	ND	0	-	ND	3120	0[B]
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	74
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	75
26B	Di-n-butyl phthalate	BMDL	330	ND	40.4	BMDL	0	-	56.1	3120	77
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3120	69
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3120	69
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3120	97
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3120	75
31B	Fluoranthene	ND	72	ND	ND	ND	0	-	51.8	3120	35
32B	Fluorene	ND	62	ND	ND	ND	0	-	316	3120	69

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0177	RESOURCE ENGINEERING	RES27514	SP10348-50	860730	0130	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3120	78
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3120	84
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	72	ND	ND	ND	0	-	ND	3120	77
39B	Naphthalene	ND	53	ND	ND	ND	0	-	982	3120	78
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3120	83
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3120	87
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	765	3120	76
45B	Pyrene	ND	62	ND	ND	ND	0	-	91.6	3120	28
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	80

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 16, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0177	RESOURCE ENGINEERING	RES27514	SP10348-50	86073	0130	0

Compound	Amount added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	80	23	120
2-Fluorobiphenyl	50	99	30	115
Terphenyl-D14	50	105	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

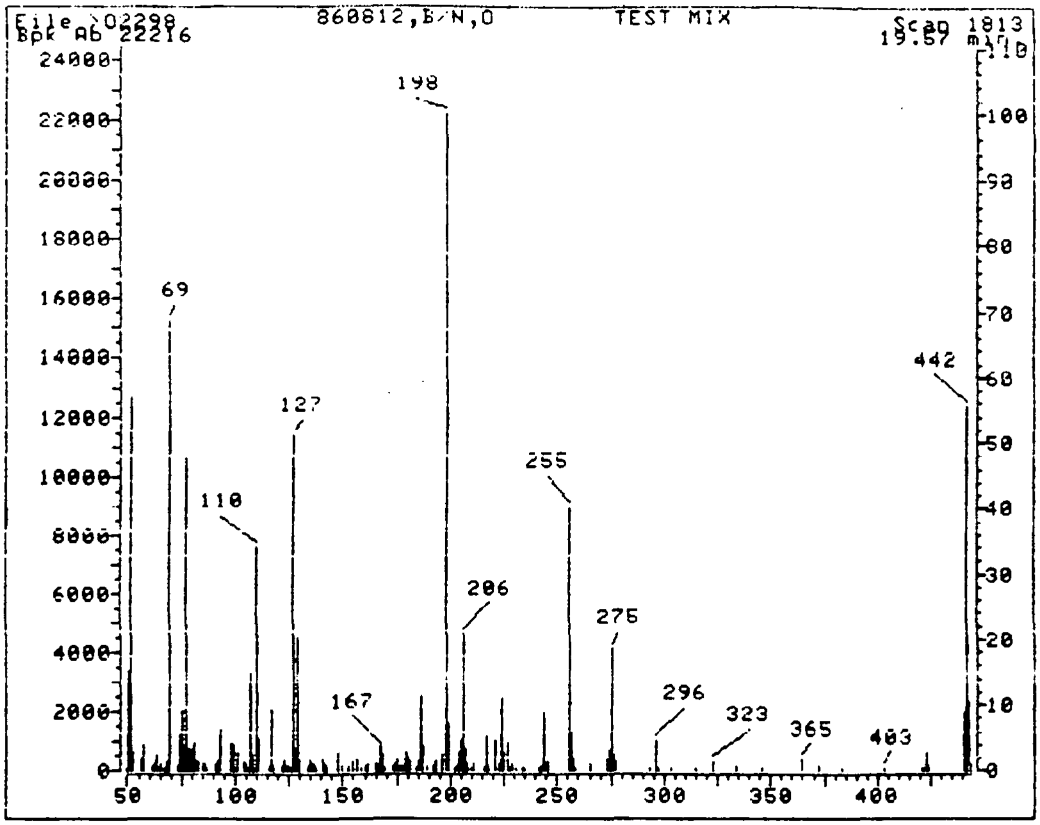


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	57.15	57.15	Ok
68	Less than 2% of mass 69	1.21	1.76	Ok
69	(reference only)	68.73	68.73	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	51.21	51.21	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.21	7.21	Ok
275	10-30% of mass 198	18.60	18.60	Ok
365	Greater than 1% of mass 198	1.85	1.85	Ok
441	0-100% of mass 443	8.64	84.28	Ok
442	Greater than 40% of mass 198	55.78	55.78	Ok
443	17-23% of mass 442	10.25	18.37	Ok

Injection Date: 08/12/86 Analyst: [illegible]
Injection Time: 16:31 Processor: Neta Mukherjee
Run No: >02298 QC Batch: QB5430
Spectrun No: 1813 Samples: N0173, N0173 ~~N0178~~,
Calib. Std

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0173	RESOURCE ENGINEERING	RES27514	SP10362-64	860730	0145	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg[A]	QC Replicate: Second ug/kg[A]	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	62	ND	ND	ND	0	-	134	3120	80
2B	Acenaphthylene	ND	110	ND	ND	ND	0	-	74.4	3120	79
3B	Anthracene	ND	62	ND	ND	ND	0	-	108	3120	71
4B	Benzidine	ND	1400	ND	ND	ND	0	-	ND	3120	0[B]
5B	Benzo(a)anthracene	ND	250	ND	ND	ND	0	-	ND	3120	77
6B	Benzo(a)pyrene	ND	81	ND	ND	ND	0	-	ND	3120	159
7B	Benzo(b)fluoranthene	ND	320	ND	ND	ND	0	-	ND	3120	122
8B	Benzo(ghi)perylene	ND	130	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	110	ND	ND	ND	0	-	ND	3120	104
10B	bis(2-Chloroethoxy)methane	ND	170	ND	ND	ND	0	-	ND	3120	72
11B	bis(2-Chloroethyl) ether	ND	180	ND	ND	ND	0	-	ND	3120	68
12B	bis(2-Chloroisopropyl)ether	ND	180	ND	ND	ND	0	-	ND	3120	46
13B	bis(2-Ethylhexyl)phthalate	ND	320	ND	1550	BMDL	0	-	ND	3120	73
14B	4-Bromophenyl phenyl ether	ND	62	ND	ND	ND	0	-	ND	3120	88
15B	Butyl benzyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	72
16B	2-Chloronaphthalene	ND	62	ND	ND	ND	0	-	ND	3120	89
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3120	78
18B	Chrysene	ND	81	ND	ND	ND	0	-	ND	3120	83
19B	Dibenzo(a,h)anthracene	ND	320	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	58
21B	1,3-Dichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	61
22B	1,4-Dichlorobenzene	ND	140	ND	ND	ND	0	-	ND	3120	69
23B	3,3'-Dichlorobenzidine	ND	530	ND	ND	ND	0	-	ND	3120	0[B]
24B	Diethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	74
25B	Dimethyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	75
26B	Di-n-butyl phthalate	ND	320	ND	40.4	BMDL	0	-	56.1	3120	77
27B	2,4-Dinitrotoluene	ND	180	ND	ND	ND	0	-	ND	3120	69
28B	2,6-Dinitrotoluene	ND	62	ND	ND	ND	0	-	ND	3120	69
29B	Di-n-octyl phthalate	ND	320	ND	ND	ND	0	-	ND	3120	97
30B	1,2-Diphenylhydrazine	ND	320	ND	ND	ND	0	-	ND	3120	75
31B	Fluoranthene	ND	71	ND	ND	ND	0	-	51.8	3120	35
32B	Fluorene	ND	62	ND	ND	ND	0	-	316	3120	69

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 19, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports						
N0173	RESOURCE ENGINEERING	RES27514	SP10362-64	860730	0145	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg A	Second ug/kg A	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
34B	Hexachlorobutadiene	ND	29	ND	ND	ND	0	-	ND	3120	78
35B	Hexachlorocyclopentadiene	ND	320	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	52	ND	ND	ND	0	-	ND	3120	84
37B	Indeno(1,2,3-c,d)pyrene	ND	150	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	71	ND	ND	ND	0	-	ND	3120	77
39B	Naphthalene	ND	52	ND	ND	ND	0	-	982	3120	78
40B	Nitrobenzene	ND	62	ND	ND	ND	0	-	ND	3120	83
41B	N-Nitrosodimethylamine	ND	320	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	320	ND	ND	ND	0	-	ND	3120	83
43B	N-Nitrosodiphenylamine	ND	62	ND	ND	ND	0	-	ND	3120	87
44B	Phenanthrene	ND	170	ND	ND	ND	0	-	765	3120	76
45B	Pyrene	ND	62	ND	ND	ND	0	-	91.6	3120	28
46B	1,2,4-Trichlorobenzene	ND	62	ND	ND	ND	0	-	ND	3120	80

A Variable replication due to non-homogeneous nature of sample matrix.

B Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 16, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N0173	RESOURCE ENGINEERING	RES27514	SP10362-64	86073	0145	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	65	23	120
2-Fluorobiphenyl	50	66	30	115
Terphenyl-D14	50	117	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

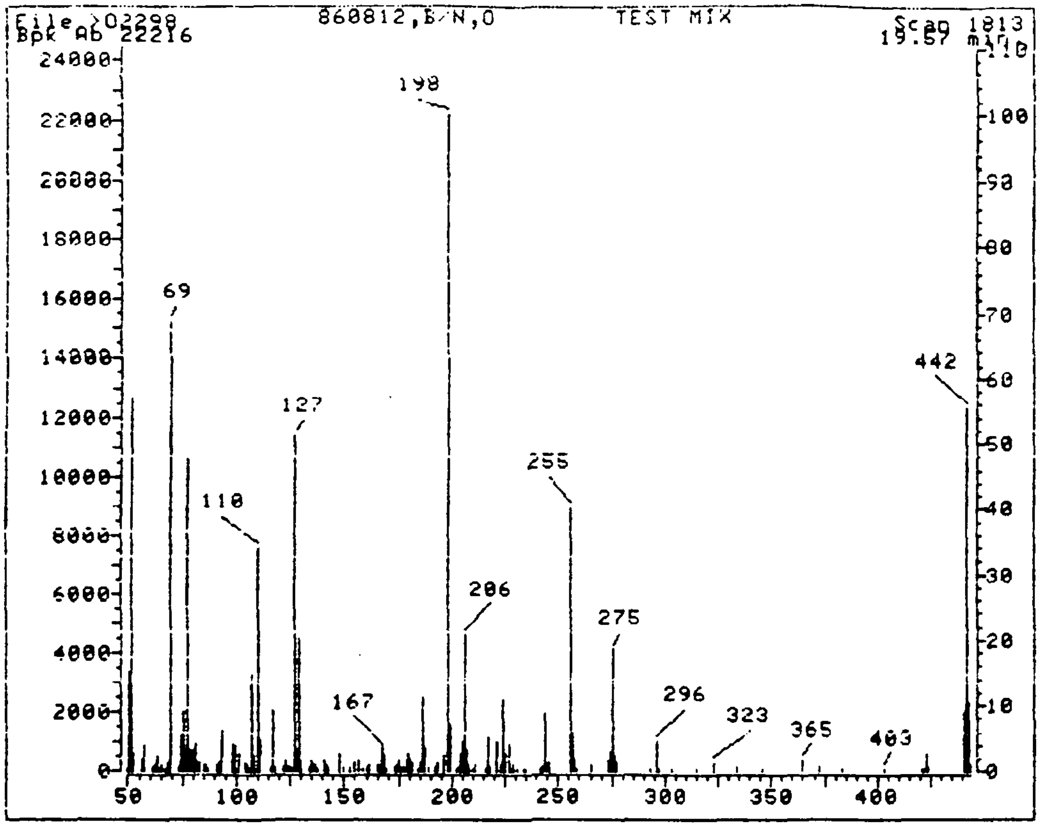


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
51	30-60% of mass 198	57.15	57.15	Ok
68	Less than 2% of mass 69	1.21	1.76	Ok
69	(reference only)	68.73	68.73	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	51.21	51.21	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.21	7.21	Ok
275	10-30% of mass 198	18.60	18.60	Ok
365	Greater than 1% of mass 198	1.85	1.85	Ok
441	0-100% of mass 443	8.64	84.28	Ok
442	Greater than 40% of mass 198	55.78	55.78	Ok
443	17-23% of mass 442	10.25	18.37	Ok

Injection Date: 08/12/86 Analyst: [illegible]
Injection Time: 16:31 Processor: Mita Mukherjee
Run No: >02298 QC Batch: QB5430
Spectrun No: 1813 Samples: N0173, N0179, ~~N0178~~
Calib. Std

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9370	RESOURCE ENGINEERING	RES27511	XREI1128-30	860804	2024	1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	70	ND	ND	ND	0	-	ND	3390	89
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	3390	95
3B	Anthracene	ND	70	ND	ND	ND	0	-	ND	3390	85
4B	Benzidine	ND	1600	ND	ND	ND	0	-	ND	3390	22[a]
5B	Benzo(a)anthracene	ND	290	ND	ND	ND	0	-	ND	3390	82
6B	Benzo(a)pyrene	ND	92	ND	ND	ND	0	-	ND	3390	113
7B	Benzo(b)fluoranthene	ND	370	ND	ND	ND	0	-	ND	3390	109
8B	Benzo(ghi)perylene	ND	150	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	3390	96
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	3390	86
11B	bis(2-Chloroethyl) ether	ND	210	ND	ND	ND	0	-	ND	3390	76
12B	bis(2-Chloroisopropyl)ether	ND	210	ND	ND	ND	0	-	ND	3390	126
13B	bis(2-Ethylhexyl)phthalate	BMDL	370	ND	ND	278	0	-	ND	3390	98
14B	4-Bromophenyl phenyl ether	ND	70	ND	ND	ND	0	-	ND	3390	66
15B	Butyl benzyl phthalate	ND	370	ND	ND	ND	0	-	ND	3390	90
16B	2-Chloronaphthalene	ND	70	ND	ND	ND	0	-	ND	3390	91
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	3390	87
18B	Chrysene	ND	92	ND	ND	ND	0	-	ND	3390	87
19B	Dibenzo(a,h)anthracene	ND	370	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	70	ND	ND	ND	0	-	ND	3390	82
21B	1,3-Dichlorobenzene	ND	70	ND	ND	ND	0	-	ND	3390	81
22B	1,4-Dichlorobenzene	ND	160	ND	ND	ND	0	-	ND	3390	80
23B	3,3'-Dichlorobenzidine	ND	610	ND	ND	ND	0	-	ND	3390	33[a]
24B	Diethyl phthalate	ND	370	ND	ND	ND	0	-	ND	3390	87
25B	Dimethyl phthalate	ND	370	ND	ND	ND	0	-	ND	3390	89
26B	Di-n-butyl phthalate	ND	370	ND	96.1	394	0	-	ND	3390	144[a]
27B	2,4-Dinitrotoluene	ND	210	ND	ND	ND	0	-	ND	3390	100
28B	2,6-Dinitrotoluene	ND	70	ND	ND	ND	0	-	ND	3390	83
29B	Di-n-octyl phthalate	BMDL	370	ND	ND	ND	0	-	ND	3390	108
30B	1,2-Diphenylhydrazine	ND	370	ND	ND	ND	0	-	ND	3390	90
31B	Fluoranthene	ND	81	ND	ND	ND	0	-	ND	3390	88
32B	Fluorene	ND	70	ND	ND	ND	0	-	ND	3390	88

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9370	RESOURCE ENGINEERING	RES27511	XREI1128-30	860804	2024	1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	70	ND	ND	ND	0	-	ND	3390	84
34B	Hexachlorobutadiene	ND	33	ND	ND	ND	0	-	ND	3390	104
35B	Hexachlorocyclopentadiene	ND	370	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	59	ND	ND	ND	0	-	ND	3390	109
37B	Indeno(1,2,3-c,d)pyrene	ND	170	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	81	ND	ND	ND	0	-	ND	3390	83
39B	Naphthalene	ND	59	ND	ND	ND	0	-	ND	3390	87
40B	Nitrobenzene	ND	70	ND	ND	ND	0	-	ND	3390	95
41B	N-Nitrosodimethylamine	ND	370	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	370	ND	ND	ND	0	-	ND	3390	96
43B	N-Nitrosodiphenylamine	ND	70	ND	ND	ND	0	-	ND	3390	114
44B	Phenanthrene	ND	200	ND	ND	ND	0	-	ND	3390	87
45B	Pyrene	ND	70	ND	ND	ND	0	-	ND	3390	78
46B	1,2,4-Trichlorobenzene	ND	70	ND	ND	ND	0	-	ND	3390	92

R Recovery manually verified.

AUG 27, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
M9370	RESOURCE ENGINEERING	RES27511	XREI1128-30	86080	2024	1
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	68	23	120
2-Fluorobiphenyl	50	78	30	115
Terphenyl-D14	50	103	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

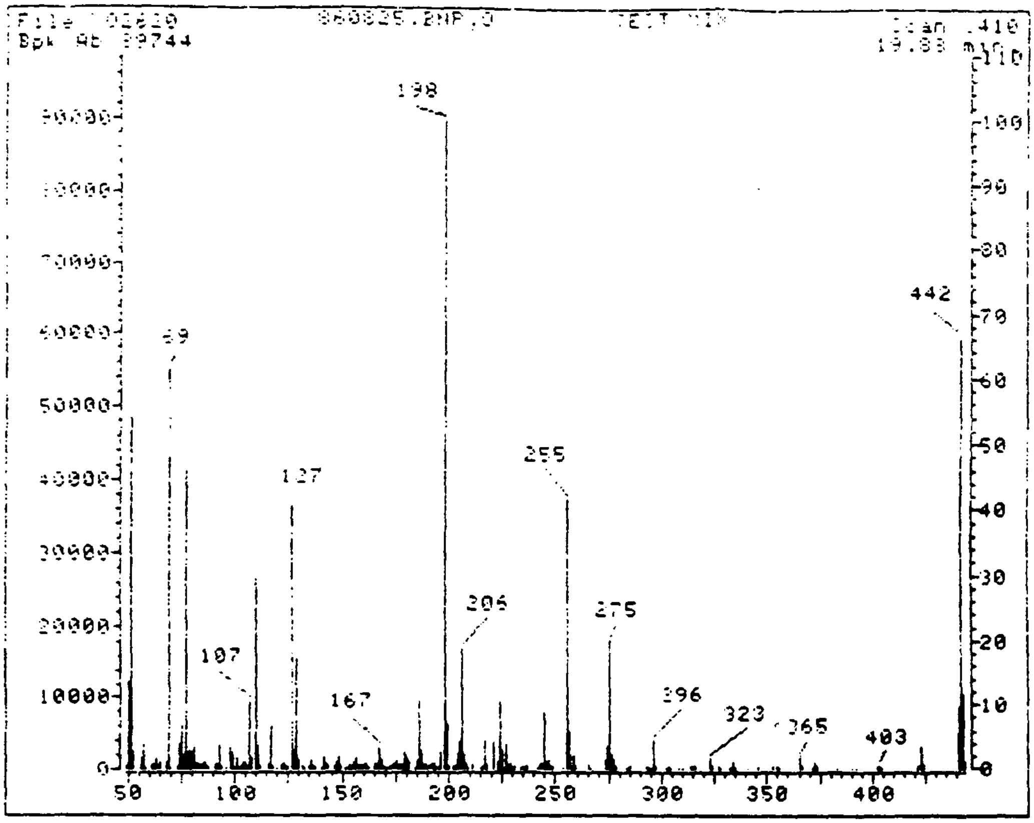


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.87	53.87	Ok
68	Less than 2% of mass 69	.89	1.45	Ok
69	(reference only)	61.49	61.49	Ok
70	Less than 2% of mass 69	.20	.33	Ok
127	40-60% of mass 198	40.35	40.35	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.79	6.79	Ok
275	10-30% of mass 198	19.84	19.84	Ok
365	Greater than 1% of mass 198	1.89	1.89	Ok
441	0-100% of mass 443	9.74	82.81	Ok
442	Greater than 40% of mass 198	66.19	66.19	Ok
443	17-23% of mass 442	11.76	17.76	Ok

Injection Date: 08/25/86 Analyst: [illegible]
Injection Time: 16:54 Processor: [illegible]
Run No: 02620 QC Batch: QB5465
Spectrum No: 1410 Samples: M9370, M9371, M9383, N1319, N131[illegible]
N1310, N1309, N1323, N1322

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9371	RESOURCE ENGINEERING	RES27511	XREI1130-32	860804	2048	1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	77	ND	ND	ND	0	-	ND	3390	89
2B	Acenaphthylene	ND	140	ND	ND	ND	0	-	ND	3390	95
3B	Anthracene	ND	77	ND	ND	ND	0	-	ND	3390	85
4B	Benzidine	ND	1800	ND	ND	ND	0	-	ND	3390	22[a]
5B	Benzo(a)anthracene	ND	320	ND	ND	ND	0	-	ND	3390	82
6B	Benzo(a)pyrene	ND	100	ND	ND	ND	0	-	ND	3390	113
7B	Benzo(b)fluoranthene	ND	400	ND	ND	ND	0	-	ND	3390	109
8B	Benzo(ghi)perylene	ND	170	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	140	ND	ND	ND	0	-	ND	3390	96
10B	bis(2-Chloroethoxy)methane	ND	210	ND	ND	ND	0	-	ND	3390	86
11B	bis(2-Chloroethyl) ether	ND	230	ND	ND	ND	0	-	ND	3390	76
12B	bis(2-Chloroisopropyl)ether	ND	230	ND	ND	ND	0	-	ND	3390	126
13B	bis(2-Ethylhexyl)phthalate	ND	400	ND	ND	278	0	-	ND	3390	98
14B	4-Bromophenyl phenyl ether	ND	77	ND	ND	ND	0	-	ND	3390	66
15B	Butyl benzyl phthalate	ND	400	ND	ND	ND	0	-	ND	3390	90
16B	2-Chloronaphthalene	ND	77	ND	ND	ND	0	-	ND	3390	91
17B	4-Chlorophenyl phenyl ether	ND	170	ND	ND	ND	0	-	ND	3390	87
18B	Chrysene	ND	100	ND	ND	ND	0	-	ND	3390	87
19B	Dibenzo(a,h)anthracene	ND	400	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	3390	82
21B	1,3-Dichlorobenzene	ND	77	ND	ND	ND	0	-	ND	3390	81
22B	1,4-Dichlorobenzene	ND	180	ND	ND	ND	0	-	ND	3390	80
23B	3,3'-Dichlorobenzidine	ND	670	ND	ND	ND	0	-	ND	3390	33[a]
24B	Diethyl phthalate	ND	400	ND	ND	ND	0	-	ND	3390	87
25B	Dimethyl phthalate	ND	400	ND	ND	ND	0	-	ND	3390	89
26B	Di-n-butyl phthalate	BMDL	400	ND	96.1	394	0	-	ND	3390	144[a]
27B	2,4-Dinitrotoluene	ND	230	ND	ND	ND	0	-	ND	3390	100
28B	2,6-Dinitrotoluene	ND	77	ND	ND	ND	0	-	ND	3390	83
29B	Di-n-octyl phthalate	ND	400	ND	ND	ND	0	-	ND	3390	108
30B	1,2-Diphenylhydrazine	ND	400	ND	ND	ND	0	-	ND	3390	90
31B	Fluoranthene	ND	89	ND	ND	ND	0	-	ND	3390	88
32B	Fluorene	ND	77	ND	ND	ND	0	-	ND	3390	88

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9371	RESOURCE ENGINEERING	RES27511	XREI1130-32	860804	2048	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
33B	Hexachlorobenzene	ND	77	ND	ND	ND	0	-	ND	3390	84
34B	Hexachlorobutadiene	ND	36	ND	ND	ND	0	-	ND	3390	104
35B	Hexachlorocyclopentadiene	ND	400	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	65	ND	ND	ND	0	-	ND	3390	109
37B	Indeno(1,2,3-c,d)pyrene	ND	190	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	89	ND	ND	ND	0	-	ND	3390	83
39B	Naphthalene	ND	65	ND	ND	ND	0	-	ND	3390	87
40B	Nitrobenzene	ND	77	ND	ND	ND	0	-	ND	3390	95
41B	N-Nitrosodimethylamine	ND	400	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	400	ND	ND	ND	0	-	ND	3390	96
43B	N-Nitrosodiphenylamine	ND	77	ND	ND	ND	0	-	ND	3390	114
44B	Phenanthrene	ND	220	ND	ND	ND	0	-	ND	3390	87
45B	Pyrene	ND	77	ND	ND	ND	0	-	ND	3390	78
46B	1,2,4-Trichlorobenzene	ND	77	ND	ND	ND	0	-	ND	3390	92

R Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports						
M9371	RESOURCE ENGINEERING	RES27511	XREI1130-32	86080	2048	1
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	73	23	120
2-Fluorobiphenyl	50	73	30	115
Terphenyl-D14	50	102	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

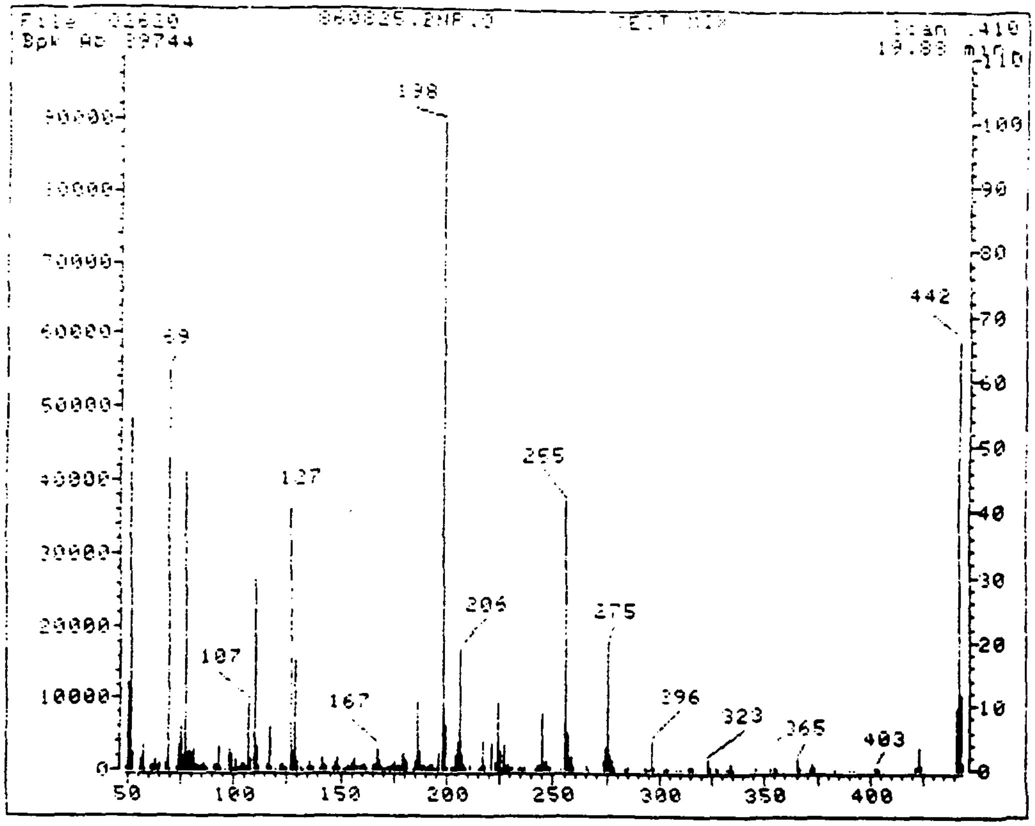


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.87	53.87	Ok
68	Less than 2% of mass 69	.89	1.45	Ok
69	(reference only)	61.49	61.49	Ok
70	Less than 2% of mass 69	.20	.33	Ok
127	40-60% of mass 198	40.35	40.35	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.79	6.79	Ok
275	10-30% of mass 198	19.84	19.84	Ok
365	Greater than 1% of mass 198	1.89	1.89	Ok
441	0-100% of mass 443	9.74	82.81	Ok
442	Greater than 40% of mass 198	66.19	66.19	Ok
443	17-23% of mass 442	11.76	17.76	Ok

Injection Date: 08/25/86 Analyst: [illegible]
Injection Time: 16:54 Processor: [illegible]
Run No: 02620 QC Batch: QB5465
Spectrum No: 1410 Samples: M9370, M9371, M9383, N1319, N1314, N1310, N1309, N1323, N1322

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 28, 1986
QB5465

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9382	RESOURCE ENGINEERING	RES27511	XREI1148-50	860804	2052	1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	63	ND	ND	ND	0	-	ND	3390	89
2B	Acenaphthylene	ND	120	ND	ND	ND	0	-	ND	3390	95
3B	Anthracene	ND	63	ND	ND	ND	0	-	ND	3390	85
4B	Benzidine	ND	1500	ND	ND	ND	0	-	ND	3390	22
5B	Benzo(a)anthracene	ND	260	ND	ND	ND	0	-	ND	3390	82
6B	Benzo(a)pyrene	ND	83	ND	ND	ND	0	-	ND	3390	113
7B	Benzo(b)fluoranthene	ND	330	ND	ND	ND	0	-	ND	3390	109
8B	Benzo(ghi)perylene	ND	140	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	120	ND	ND	ND	0	-	ND	3390	96
10B	bis(2-Chloroethoxy)methane	ND	180	ND	ND	ND	0	-	ND	3390	86
11B	bis(2-Chloroethyl) ether	ND	190	ND	ND	ND	0	-	ND	3390	76
12B	bis(2-Chloroisopropyl)ether	ND	190	ND	ND	ND	0	-	ND	3390	126
13B	bis(2-Ethylhexyl)phthalate	ND	330	ND	ND	BMDL	0	-	ND	3390	98
14B	4-Bromophenyl phenyl ether	ND	63	ND	ND	ND	0	-	ND	3390	66
15B	Butyl benzyl phthalate	ND	330	ND	ND	ND	0	-	ND	3390	90
16B	2-Chloronaphthalene	ND	63	ND	ND	ND	0	-	ND	3390	91
17B	4-Chlorophenyl phenyl ether	ND	140	ND	ND	ND	0	-	ND	3390	87
18B	Chrysene	ND	83	ND	ND	ND	0	-	ND	3390	87
19B	Dibenzo(a,h)anthracene	ND	330	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3390	82
21B	1,3-Dichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3390	81
22B	1,4-Dichlorobenzene	ND	150	ND	ND	ND	0	-	ND	3390	80
23B	3,3'-Dichlorobenzidine	ND	550	ND	ND	ND	0	-	ND	3390	33
24B	Diethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3390	87
25B	Dimethyl phthalate	ND	330	ND	ND	ND	0	-	ND	3390	89
26B	Di-n-butyl phthalate	666	330	ND	96.1	394	0	-	ND	3390	144
27B	2,4-Dinitrotoluene	ND	190	ND	ND	ND	0	-	ND	3390	100
28B	2,6-Dinitrotoluene	ND	63	ND	ND	ND	0	-	ND	3390	83
29B	Di-n-octyl phthalate	ND	330	ND	ND	ND	0	-	ND	3390	108
30B	1,2-Diphenylhydrazine	ND	330	ND	ND	ND	0	-	ND	3390	90
31B	Fluoranthene	ND	73	ND	ND	ND	0	-	ND	3390	88
32B	Fluorene	ND	63	ND	ND	ND	0	-	ND	3390	88

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 28, 1986
QB5465

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9382	RESOURCE ENGINEERING	RES27511	XREI1148-50	860804	2052	1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	63	ND	ND	ND	0	-	ND	3390	84
34B	Hexachlorobutadiene	ND	30	ND	ND	ND	0	-	ND	3390	104
35B	Hexachlorocyclopentadiene	ND	330	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	53	ND	ND	ND	0	-	ND	3390	109
37B	Indeno(1,2,3-c,d)pyrene	ND	160	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	73	ND	ND	ND	0	-	ND	3390	83
39B	Naphthalene	ND	53	ND	ND	ND	0	-	ND	3390	87
40B	Nitrobenzene	ND	63	ND	ND	ND	0	-	ND	3390	95
41B	N-Nitrosodimethylamine	ND	330	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	330	ND	ND	ND	0	-	ND	3390	96
43B	N-Nitrosodiphenylamine	ND	63	ND	ND	ND	0	-	ND	3390	114
44B	Phenanthrene	ND	180	ND	ND	ND	0	-	ND	3390	87
45B	Pyrene	ND	63	ND	ND	ND	0	-	ND	3390	78
46B	1,2,4-Trichlorobenzene	ND	63	ND	ND	ND	0	-	ND	3390	92

AUG 28, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9382	RESOURCE ENGINEERING	RES27511	XREI1148-50	86080	2052	1

Compound	Amount added ug	% Recovery	Control Limits* Lower	Control Limits* Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	70	23	120
2-Fluorobiphenyl	50	74	30	115
Terphenyl-D14	50	130	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits

** Advisory Limits Only

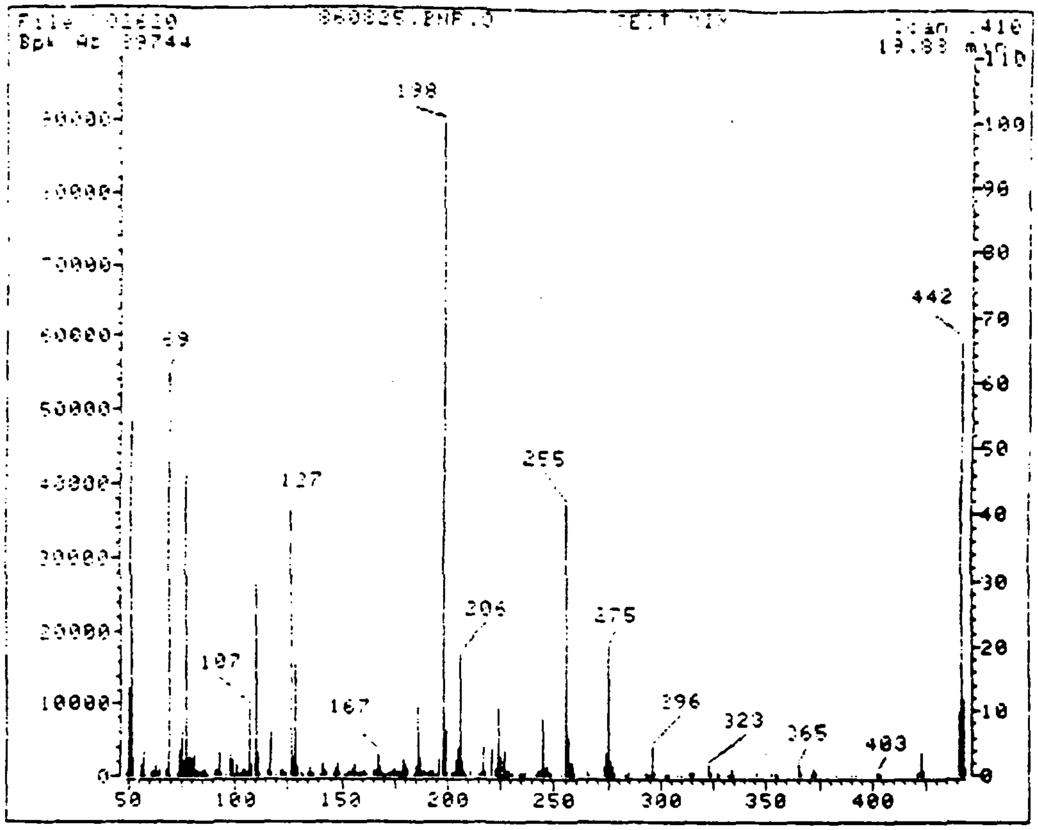


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of	53.87	53.87	Ok
68	Less than 2% of mass 69	.89	1.45	Ok
69	(reference only)	61.49	61.49	Ok
70	Less than 2% of mass 69	.20	.33	Ok
127	40-60% of mass 198	40.35	40.35	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.79	6.79	Ok
275	10-30% of mass 198	19.84	19.84	Ok
365	Greater than 1% of mass 198	1.89	1.89	Ok
441	0-100% of mass 443	9.74	82.81	Ok
442	Greater than 40% of mass 198	66.19	66.19	Ok
443	17-23% of mass 442	11.76	17.76	Ok

Injection Date: 08/25/86   Analyst: [signature]
Injection Time: 16:54   Processor: [signature]
Run No: 02620   QC Batch: QB5465
Spectrum Id: 1410   Samples: M9370, M9371, M9383, N1319, N1314, N1310, N1309, N1323, N1322

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9383	RESOURCE ENGINEERING	RES27511	XREI1150-51	860804		1

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen. Added ug/kg	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	72	ND	ND	ND	0	-	ND	3390	84
34B	Hexachlorobutadiene	ND	34	ND	ND	ND	0	-	ND	3390	104
35B	Hexachlorocyclopentadiene	ND	380	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	60	ND	ND	ND	0	-	ND	3390	109
37B	Indeno(1,2,3-c,d)pyrene	ND	180	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	83	ND	ND	ND	0	-	ND	3390	83
39B	Naphthalene	ND	60	ND	ND	ND	0	-	ND	3390	87
40B	Nitrobenzene	ND	72	ND	ND	ND	0	-	ND	3390	95
41B	N-Nitrosodimethylamine	ND	380	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	380	ND	ND	ND	0	-	ND	3390	96
43B	N-Nitrosodiphenylamine	ND	72	ND	ND	ND	0	-	ND	3390	114
44B	Phenanthrene	ND	200	ND	ND	ND	0	-	ND	3390	87
45B	Pyrene	ND	72	ND	ND	ND	0	-	ND	3390	78
46B	1,2,4-Trichlorobenzene	ND	72	ND	ND	ND	0	-	ND	3390	92

A Recovery manually verified.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 29, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9383	RESOURCE ENGINEERING	RES27511	XREI1150-51	860804	1	

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen. Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	72	ND	ND	ND	0	-	ND	3390	89
2B	Acenaphthylene	ND	130	ND	ND	ND	0	-	ND	3390	95
3B	Anthracene	ND	72	ND	ND	ND	0	-	ND	3390	85
4B	Benzidine	ND	1700	ND	ND	ND	0	-	ND	3390	22a
5B	Benzo(a)anthracene	ND	290	ND	ND	ND	0	-	ND	3390	82
6B	Benzo(a)pyrene	ND	94	ND	ND	ND	0	-	ND	3390	113
7B	Benzo(b)fluoranthene	ND	380	ND	ND	ND	0	-	ND	3390	109
8B	Benzo(ghi)perylene	ND	150	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	130	ND	ND	ND	0	-	ND	3390	96
10B	bis(2-Chloroethoxy)methane	ND	200	ND	ND	ND	0	-	ND	3390	86
11B	bis(2-Chloroethyl) ether	ND	210	ND	ND	ND	0	-	ND	3390	76
12B	bis(2-Chloroisopropyl)ether	ND	210	ND	ND	ND	0	-	ND	3390	126
13B	bis(2-Ethylhexyl)phthalate	ND	380	ND	ND	278	0	-	ND	3390	98
14B	4-Bromophenyl phenyl ether	ND	72	ND	ND	ND	0	-	ND	3390	66
15B	Butyl benzyl phthalate	ND	380	ND	ND	ND	0	-	ND	3390	90
16B	2-Chloronaphthalene	ND	72	ND	ND	ND	0	-	ND	3390	91
17B	4-Chlorophenyl phenyl ether	ND	160	ND	ND	ND	0	-	ND	3390	87
18B	Chrysene	ND	94	ND	ND	ND	0	-	ND	3390	87
19B	Dibenzo(a,h)anthracene	ND	380	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	72	ND	ND	ND	0	-	ND	3390	82
21B	1,3-Dichlorobenzene	ND	72	ND	ND	ND	0	-	ND	3390	81
22B	1,4-Dichlorobenzene	ND	170	ND	ND	ND	0	-	ND	3390	80
23B	3,3'-Dichlorobenzidine	ND	620	ND	ND	ND	0	-	ND	3390	33a
24B	Diethyl phthalate	ND	380	ND	ND	ND	0	-	ND	3390	87
25B	Dimethyl phthalate	ND	380	ND	ND	ND	0	-	ND	3390	89
26B	Di-n-butyl phthalate	1540	380	ND	96.1	394	0	-	ND	3390	144a
27B	2,4-Dinitrotoluene	ND	210	ND	ND	ND	0	-	ND	3390	100
28B	2,6-Dinitrotoluene	ND	72	ND	ND	ND	0	-	ND	3390	83
29B	Di-n-octyl phthalate	ND	380	ND	ND	ND	0	-	ND	3390	108
30B	1,2-Diphenylhydrazine	ND	380	ND	ND	ND	0	-	ND	3390	90
31B	Fluoranthene	ND	83	ND	ND	ND	0	-	ND	3390	88
32B	Fluorene	ND	72	ND	ND	ND	0	-	ND	3390	88

ETC ENVIRONMENTAL TESTING and CERTIFICATION

AUG 27, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Solid Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
M9383	RESOURCE ENGINEERING	RES27511	XREI1150-51	86080	1	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	-	-	81	117
p-Bromofluorobenzene	-	-	74	121
1,2-Dichloroethane-D4	-	-	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	77	23	120
2-Fluorobiphenyl	50	70	30	115
Terphenyl-D14	50	116	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

* IFB EPA Control Limits
** Advisory Limits Only

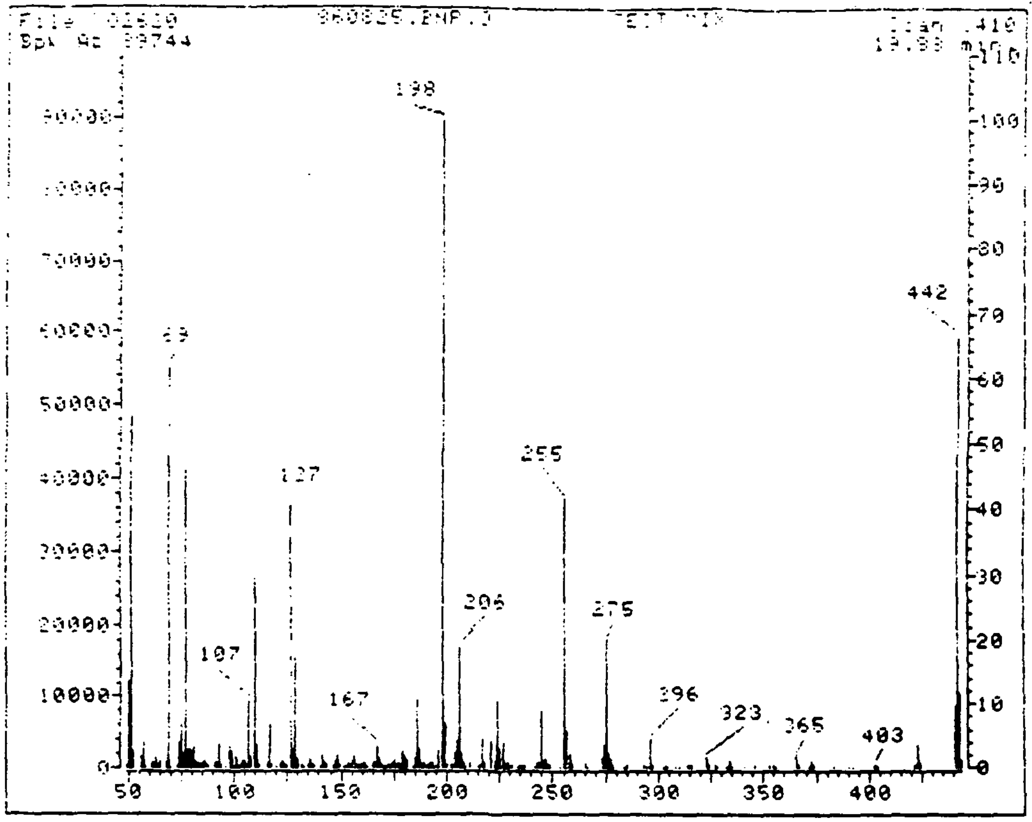


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	53.87	53.87	Ok
68	Less than 2% of mass 69	.89	1.45	Ok
69	(reference only)	61.49	61.49	Ok
70	Less than 2% of mass 69	.20	.33	Ok
127	40-60% of mass 198	40.35	40.35	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.79	6.79	Ok
275	10-30% of mass 198	19.84	19.84	Ok
365	Greater than 1% of mass 198	1.89	1.89	Ok
441	0-100% of mass 443	9.74	82.81	Ok
442	Greater than 40% of mass 198	66.19	66.19	Ok
443	17-23% of mass 442	11.76	17.76	Ok

Injection Date: 08/25/86 Analyst: [signature]
Injection Time: 16:54 Processor: [signature]
Run No: 02620 QC Batch: QBS465
Spectrum No: 1410 Samples: M9390, M9371, M9383, N1319, N131
N1310, N1309, N1323, N1322

Appendix 7

Contaminated Soil Volume Calculations

APPENDIX 7

CONTAMINATED SOIL VOLUME CALCULATIONS

Dimensions:

Lagoon bottom area	=	7.5 acres
Sidewall length	=	3300 feet
Sidewall depth	=	28 feet

Case 1: Contaminant Concentration level 1 ppm

Basis:

- Contamination extends beneath sludge/soil interface a distance of 16 feet.
- Three areas of the existing dike are identified as containing more than 1 ppm PNA's

Volumes:

Bottom:	7.5 acres x 43560 ft^2/acre x 16 ft	=	193,600 yd^3
Sides:	3300 ft x 28 ft x 16 ft	=	54,755
Dikes:	75 ft x 75 ft x 10 ft	=	2,083
	50 ft x 50 ft x 25 ft	=	2,315
	300 ft x 50 ft x 25 ft	=	13,888
			266,641 yd^3
		call	267,000 yd^3

Case 2: Contaminant Concentration level 10 ppm

Basis:

- Contamination extends beneath sludge/soil interface a distance of 3 feet
- Two areas of the existing dike are identified as containing more than 10 ppm PNA's

Bottom:	7.5 acres x 43560 ft^2/acre x 3 ft	=	36,300 yd^3
Sides:	3300 ft x 28 ft x 3.0 ft	=	10,267
Dikes:	75 ft x 75 ft x 10 ft	=	2,083
	50 ft x 50 ft x 25 ft	=	2,315
			50,965
		call	51,000 yd^3

Case 3: Contaminant Concentration of 100 ppm

Basis:

- Contamination extends beneath sludge/soil interface a distance of 2 feet
- Two areas of the existing dike are identified as containing more than 100 ppm PNA's

Bottom:	7.5 acres x 43560 ft^2/acre x 2 ft	=	24,200 yd^3
Sides:	3300 ft x 28 ft x 2 ft	=	6,844
Dikes:	75 ft x 75 ft x 10 ft	=	2,083
	50 ft x 50 ft x 25 ft	=	2,315
			35,442
		call	35,400 yd^3

Case 4: Contaminant Concentration to 1000 ppm

Basis:

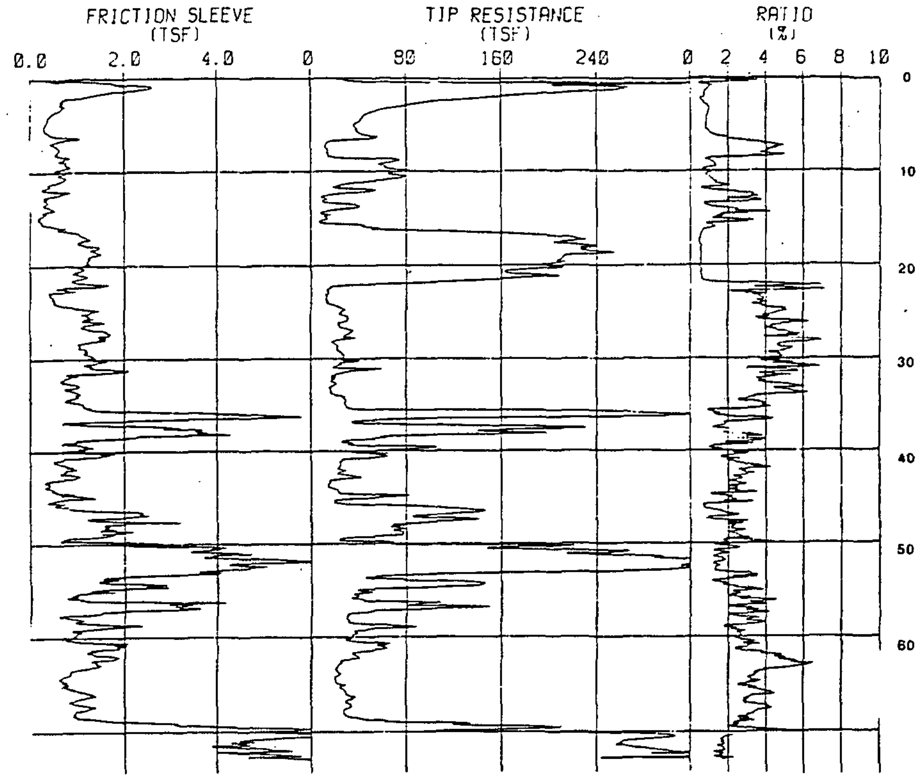
- Contamination extends beneath sludge/soil interface a distance of 1.5 feet
- One area of the existing dike is identified as containing more than 1000 ppm PNA's

Bottom:	7.5 acres x 43560 ft^2/acre x 1.5 ft	=	18,150 yd^3
Sides:	3300 ft x 28 ft x 1.5 ft	=	5,133
Dikes:	75 ft x 75 ft x 10 ft	=	2,083
			25,366
		call	25,500 yd^3

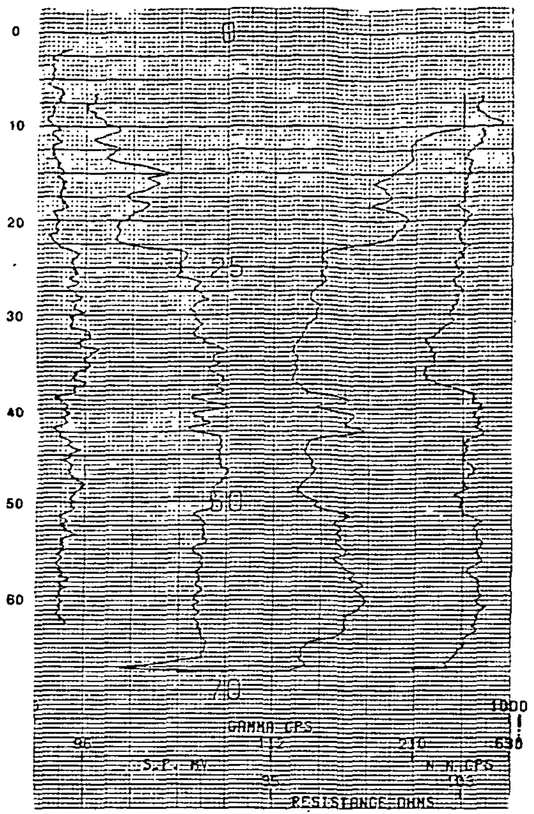
Appendix 8

Alluvial Remnant Assessment Comparison
of Logging Technique

CPT-10



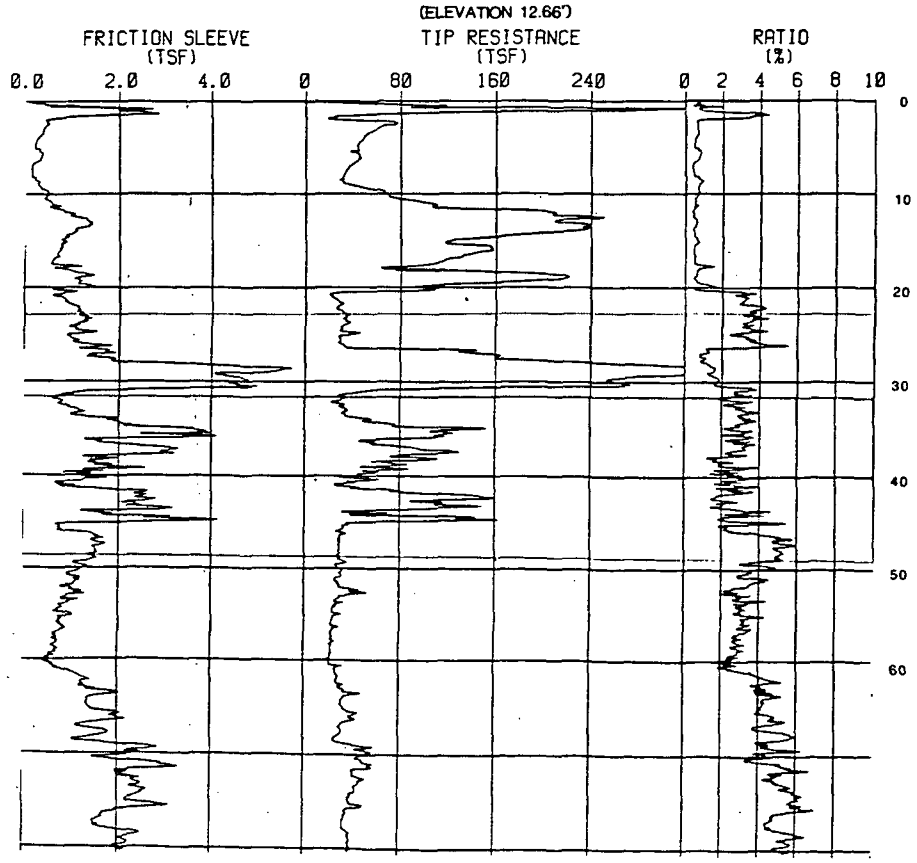
R-1
E-LOG



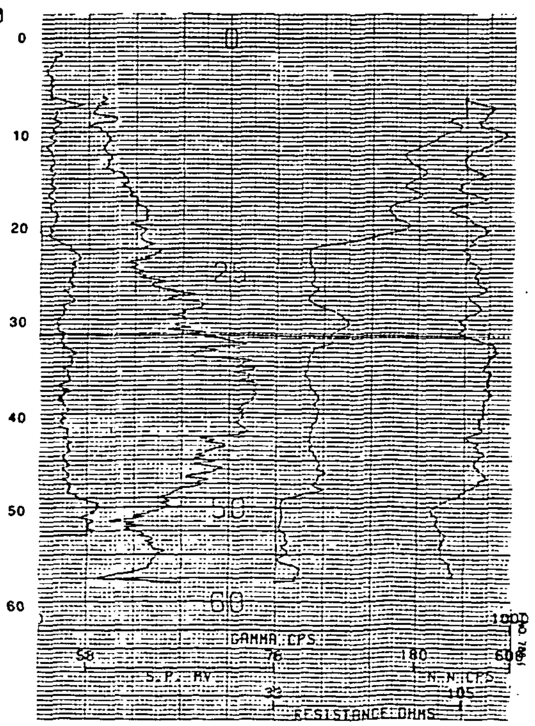
R-1 (22' E CPT-10)
CONTINUOUSLY SAMPLED BORING

SURFACE FILL, gravels and clay
VERY SANDY CLAY, tan and orange
SAND, tan, fine to medium grained, angular, wet
SILTY SAND, tan, very fine grained, wet
CLAYEY SAND, orange and tan, wet
VERY SANDY CLAY, gray
SILTY CLAY, gray
CLAYEY SILT, red, black pinpoint staining, white calcareous nodules
SILTY CLAY, red and blue with calcareous nodules decreasing silt with depth
VERY CLAYEY SAND, gray and tan, very fine grained, wet
SILTY SAND, gray
CLAYEY SILT, gray and orange
SILTY CLAY, bluish gray
CLAYEY SAND, gray, wet
SILTY SAND, gray, damp
CLAYEY SAND, gray
SANDY SILT, gray
SILTY CLAY, green and brown, with gray silt lenses, calcareous nodules, very stiff

CPT-2
(ELEVATION 12.66')



R-2
E-LOG



R-2 (3' E CPT-2)
CONTINUOUSLY SAMPLED BORING

ROADFILL, black, asphalt, sandy clay
SLIGHTLY SILTY SAND, tan, medium grained, wet
SAND, tan, fine to medium grained quartz, angular to subrounded, some multicolored gravels, wet to saturated
SILTY SAND, brown, very fine grained
SLIGHTLY CLAYEY SAND, grayish white, some Fe staining
VERY SILTY CLAY, bluish gray with orange mottles
VERY CLAYEY SAND, blue and red
SLIGHTLY SANDY CLAY, rose and gold
VERY SILTY CLAY, gray with orange mottles
SILTY SAND, tan, wet
CLAYEY SAND, gray and orange, very fine grain, grain size increasing with depth, damp
SILTY SAND, tan, medium grain, wet
SILTY CLAY, red, some blue veining
SILTY CLAY, brown and red, interbedded with silty sand, gray and gold, some calcareous nodules
CLAYEY SILT, dark brown, with layers of calcareous pebbles

RESOURCE ENGINEERING
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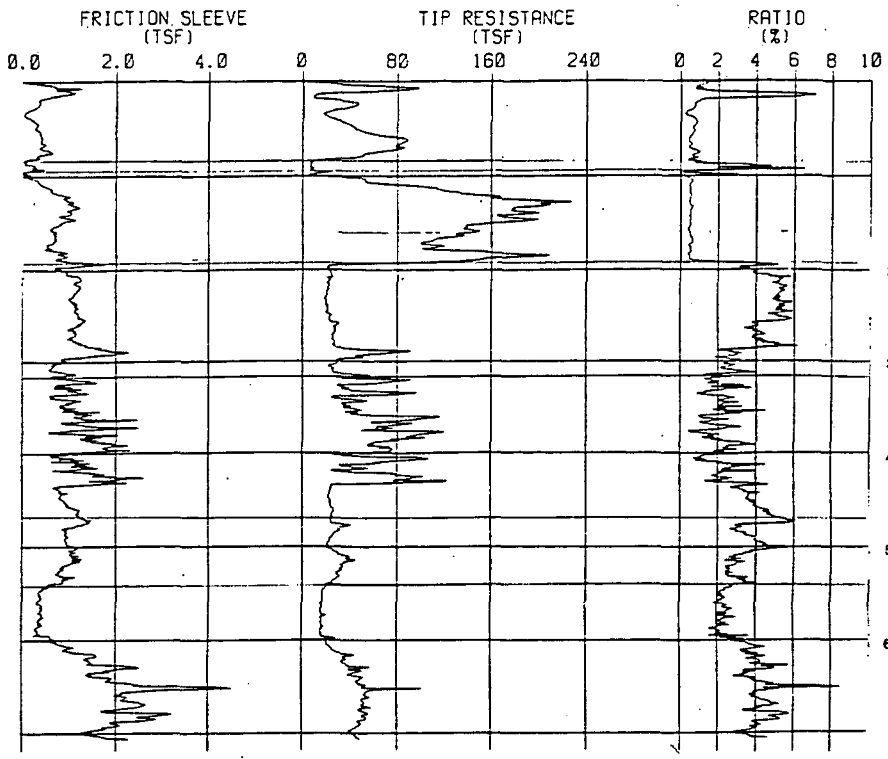
HOUSTON, TEXAS

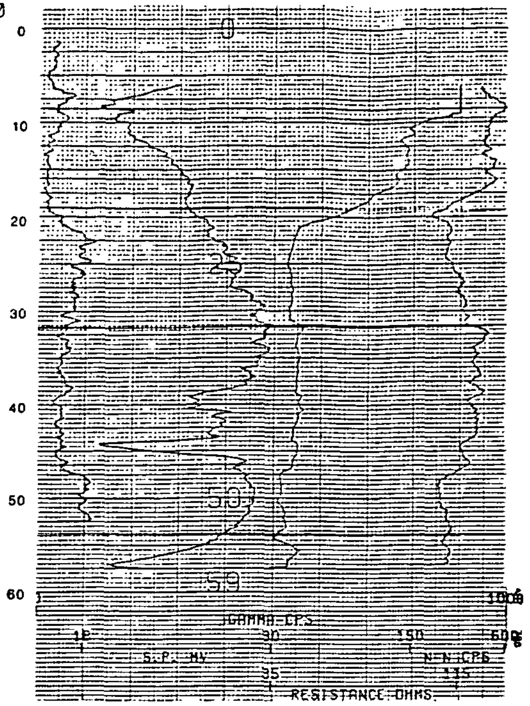
APPENDIX 8
1986 F.I. ALLUVIAL REMNANT ASSESSMENT COMPARISON OF LOGGING TECHNIQUES
FRENCH LIMITED

DRAWN BY: LCS	DATE: 11-21-86	PROJECT NO.: 275-14
CHK'D BY: SLB	REVISED:	DWG.NO.: 1

CPT-4
(ELEVATION 11.95')



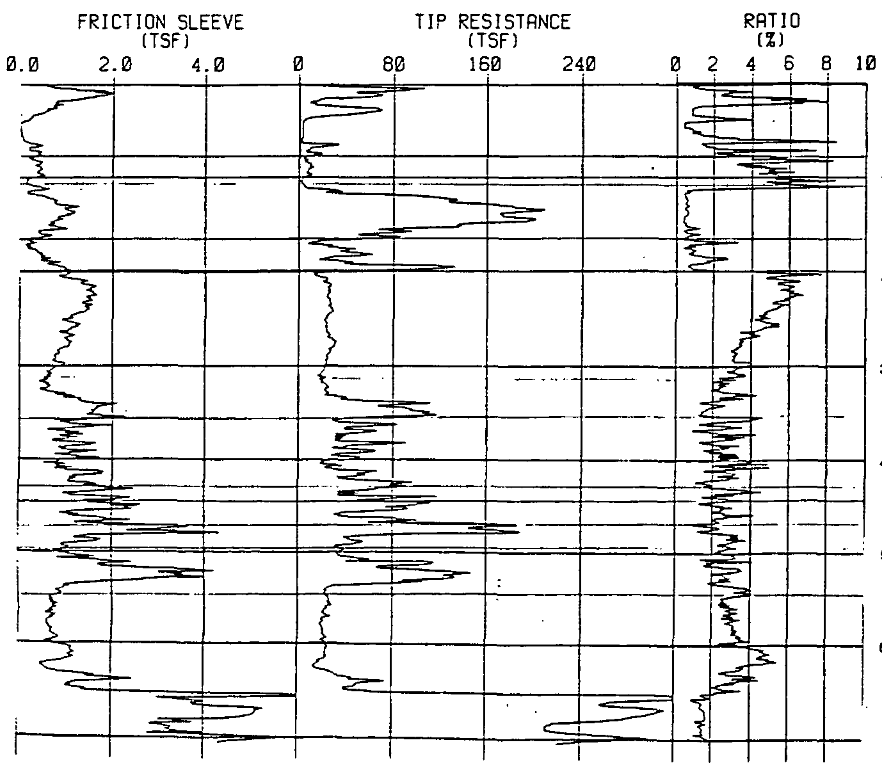
R-3
E-LOG



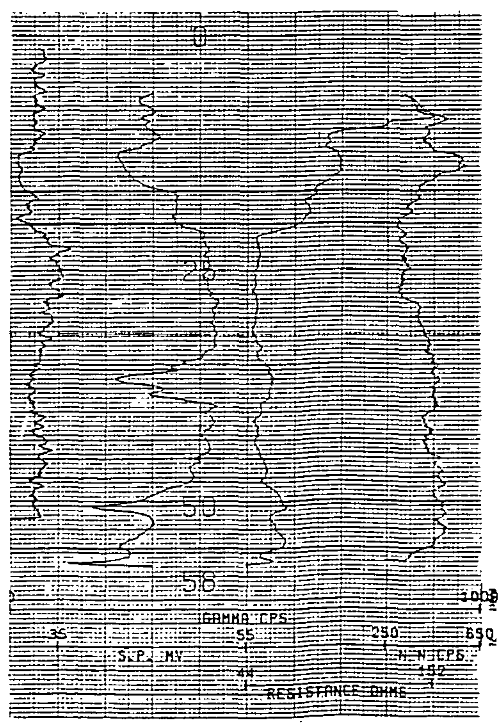
R-3 (1' E CPT-4)
CONTINUOUSLY SAMPLED BORING

- ROAD FILL, GRAVEL, SILTY SAND, black, glass and metal fragments
- SILTY SAND, dark gray, medium grain, damp, color becoming brown
- VERY SANDY CLAY, grayish green
- SAND, white, fine to medium grained quartz, some multi-colored gravels
- SILTY SAND, gray, fine grained, wet
- SILTY CLAY, red with tan lenses, calcareous chips, black pinpoint staining, very stiff
  - increasing silt, gray and rose mottling color
- VERY SANDY SILT, white
- SANDY CLAY-CLAYEY SAND, gray, in alternating layers
  - thin layer of orange coarse sand
- SILTY SAND, gray, rose, orange, wet, odor
- VERY SILTY CLAY, gray, odor, color becoming red with depth
- CLAYEY SILT, rose, dry
- CLAY, brown, interbedded with gray and gold silt, calcareous pebbles
- CLAYEY SILT, dark brown with gray silt lenses
- SILTY CLAY, dark blue and brown, interbedded with gray silt

CPT-6
(ELEVATION 11.23')



R-4
E-LOG



R-4 (12.7' CPT-6)
CONTINUOUSLY SAMPLED BORING

- ASPHALT-ROAD FILL, black
- SILTY CLAY, black, organic, ditch fill
- SILTY SAND, black to dark gray, 30% fines
- SAND, dark gray to tan, quartz sand, medium to fine grained, multicolored grains, wet
- SILTY SAND, gray with orange oxidized pockets, very fine grained, wet
- CLAYEY SAND, medium gray, satured, very fine grained
- SILTY CLAY, red, very stiff, some calcareous nodules Fe staining, blue veining
  - becoming gray in color
- SLIGHTLY SANDY SILT, gray, compact
- SILTY SAND, orange, damp, odor
  - color becoming gray
- SANDY CLAY, gray, odor
- SANDY SILT, gray, odor
- SANDY CLAY, gray, odor, damp
- SILTY SAND-SANDY SILT, pale gray, wet, odor
- SILTY CLAY, brown and dark blue, interbedded with orange sand and gray silt
- CLAYEY SILT, brown

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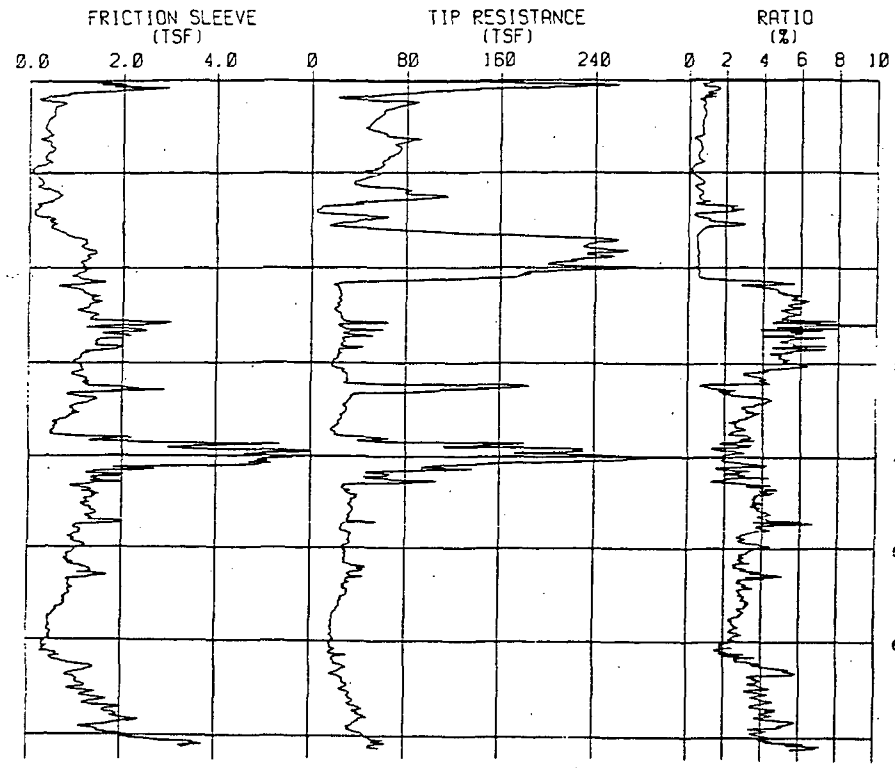
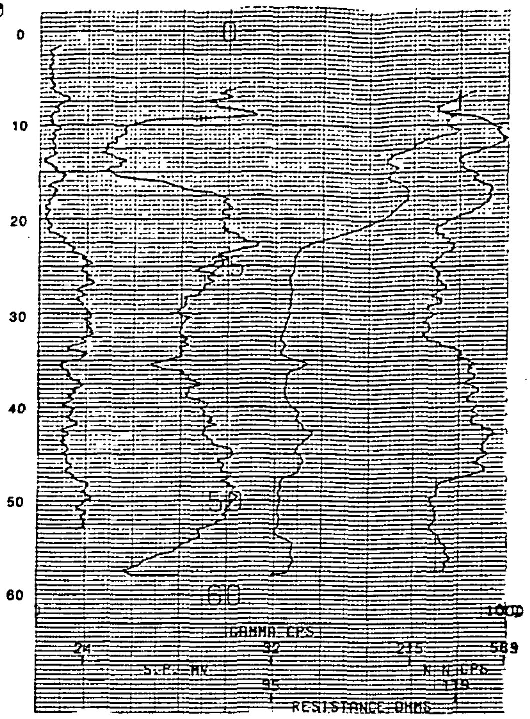
APPENDIX 8
1986 F.I. ALLUVIAL REMNANT ASSESSMENT COMPARISON OF LOGGING TECHNIQUES
FRENCH LIMITED

DRAWN BY: LCS	DATE: 11-21-86	PROJECT NO.: 275-14
CHK'D BY: SLB	REVISED:	DWG.NO.: 2

CPT-17



R-5
E-LOG



R-5 (.5 W CPT-17)
CONTINUOUSLY SAMPLED BORING

ROAD FILL, Gravel, Asphalt, orange medium grained sand

CLAYEY SAND, pale gray

SAND, white, very fine grained

SILTY SAND, tan

SAND, gold, medium to coarse, some multicolored gravels

SILTY SAND, gray, medium grained, satured, poor recovery

SILTY CLAY, red with blue veining, some calcareous pebbles, stiff to very stiff

SANDY CLAY, bluish gray, tan

CLAYEY SILT, red

SILTY CLAY, gray

VERY CLAYEY SAND, gray

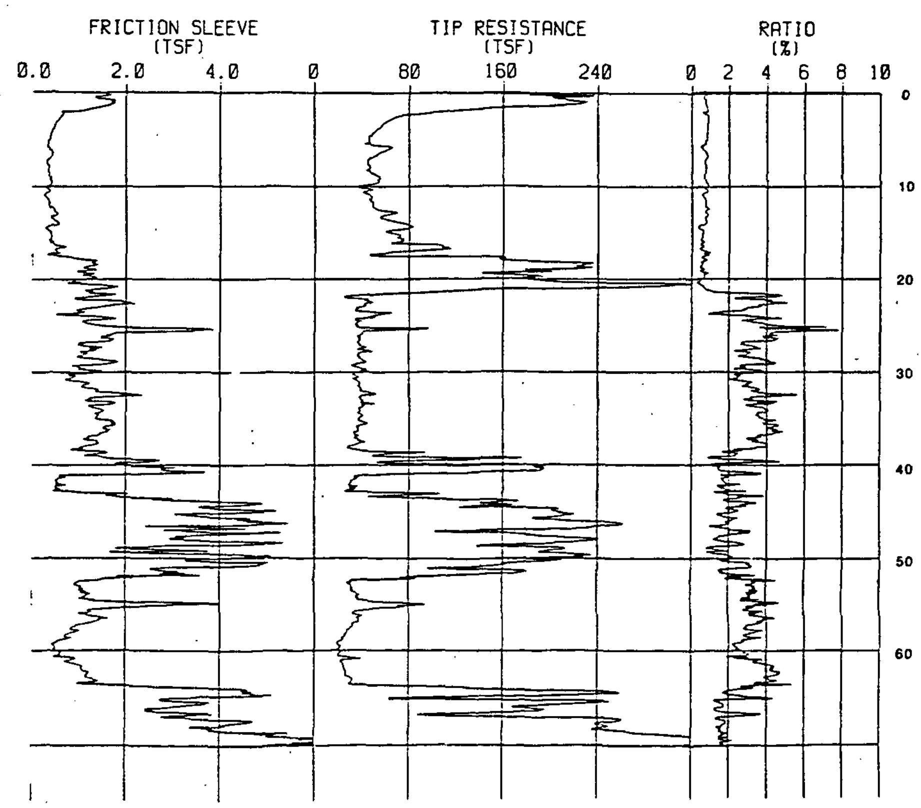
SILTY SAND, gray, very fine grained

SANDY CLAY, gray

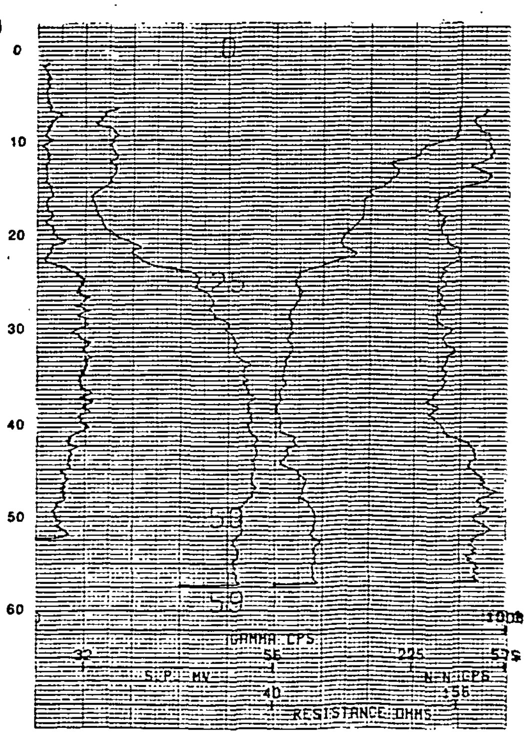
CLAY, red and brown, interbedded with silt, blue and gold, some calcareous nodules

SILT, gray with dark brown clay

CPT-18
(ELEVATION 14.81')



R-6
E-LOG



R-6 (.5' E CPT-18)
CONTINUOUSLY SAMPLED BORING

ROADFILL, sand and gravel

SILTY SAND, tan, fine grained, wet

SLIGHTLY CLAYEY SAND, white, fine grained saturated

SAND, white, medium to fine grain, angular to sub-rounded quartz, some multicolored gravels, wet

SAND, orange, fg-vfg some silt

SLIGHTLY SILTY SAND, white and gray fine, grained to very fine grained

CLAY, red, black pinpoints, calcareous nodules, stiff

sandy silt seam, red @ 27.4'

CLAYEY SILT, red and blue

some silty clay and sandy clay layers

SANDY CLAY, gray, damp

SANDY SILT, gray

CLAYEY SAND, gray and yellow, damp

CLAYEY SILT, red and gray

SANDY SILT, gray and yellow

SILTY CLAY, dark brown, interbedded with gray and yellow silt

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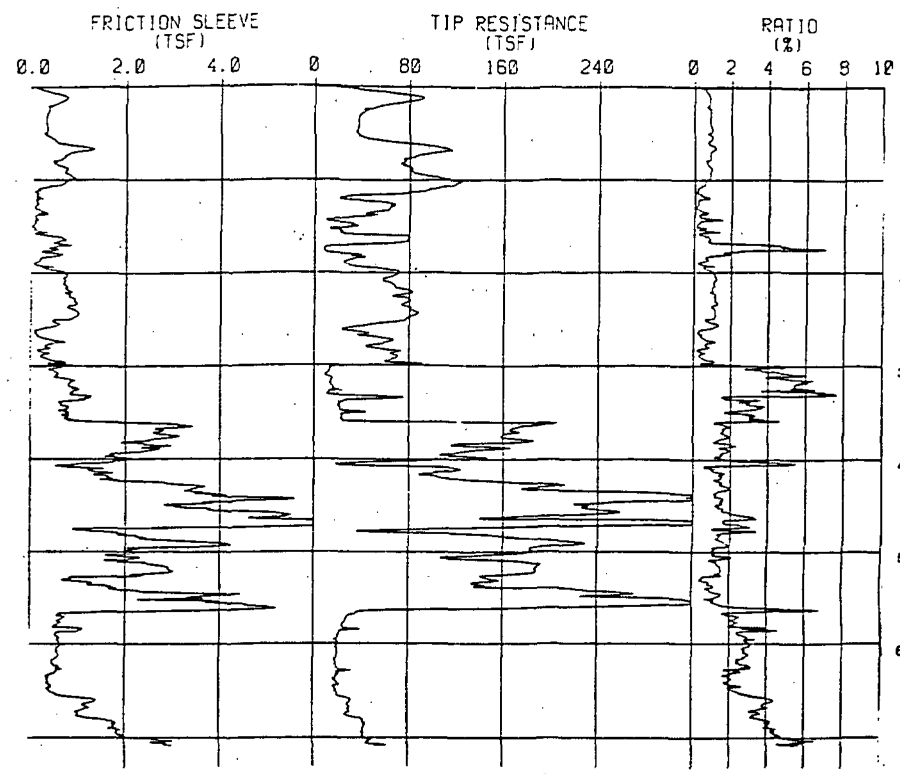
HOUSTON, TEXAS

APPENDIX 8
1986 F.I. ALLUVIAL REMNANT ASSESSMENT COMPARISON OF LOGGING TECHNIQUES
FRENCH LIMITED

DRAWN BY: LCS	DATE: 11-21-86	PROJECT NO.: 275-14
CHK'D BY: SLB	REVISED:	DWG.NO.: 3

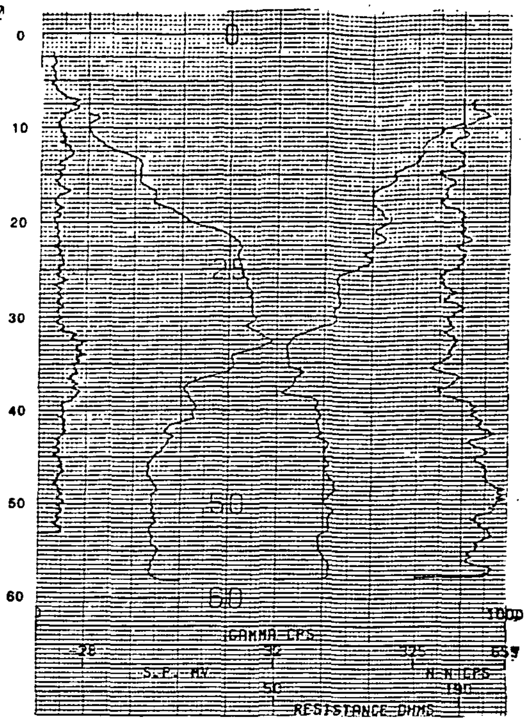
CPT-21

(ELEVATION 14.69')



R-7

E-LOG



R-7 (9' W CPT-21)

CONTINUOUSLY SAMPLED BORING

SAND AND GRAVELS, white and multicolored grains, subangular to subrounded, saturated

CLAYEY SAND, orange and gray, fg-vfg, odor

SILTY SAND, tan, subangular, wet

CLAYEY SAND SEAM, gray

SANDY SILT, gray

SILTY SAND, orange and tan, fine grained, saturated

SILTY CLAY, gray

SILTY SAND, gray, wet

CLAYEY SAND, gray, wet

SILTY CLAY, gray and orange, very stiff

SANDY CLAY, bluish green

SILTY CLAY, bluish green with red veins

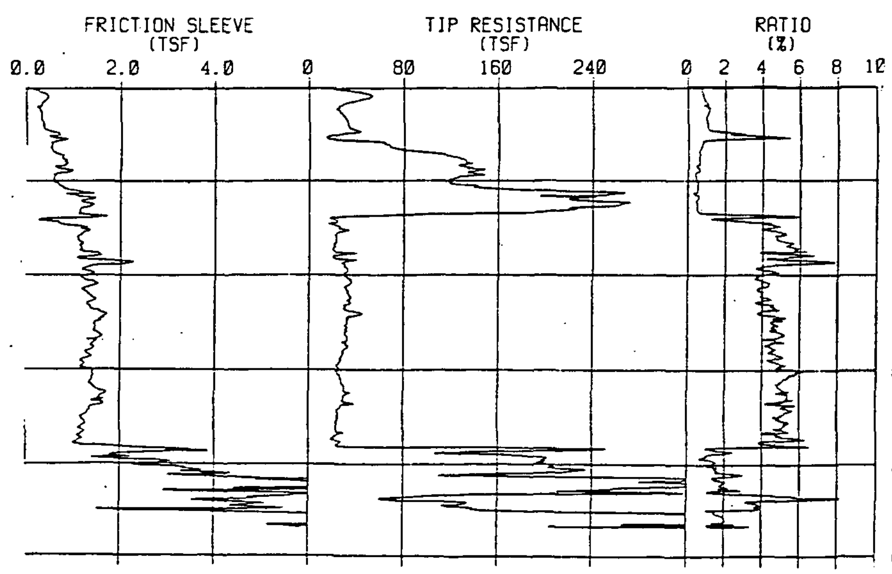
SILTY SAND, gray, Fe stains, saturated, very fine grain to fine grain

increasing grain size

CLAYEY SILT, tan

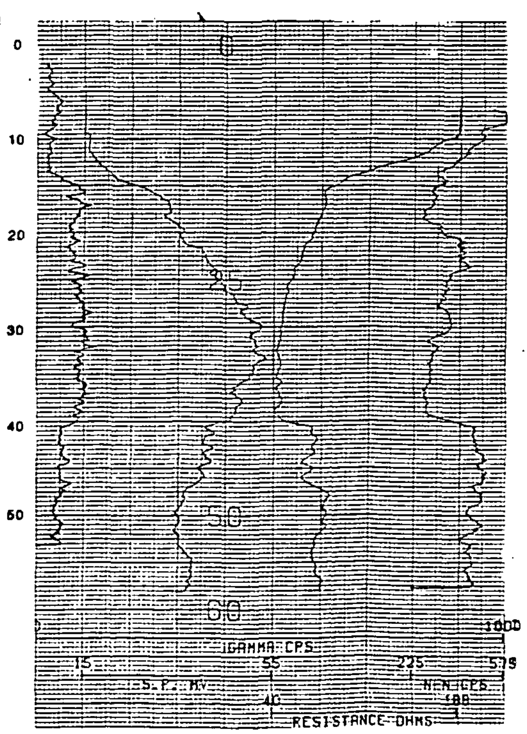
CPT-24

(ELEVATION 16.54')



R-8

E-LOG



R-8 (1' E CPT-24)

CONTINUOUSLY SAMPLED BORING

ASPHALT, roadfill, black

SAND, brown quartz, angular to subrounded, 10% fines

CLAYEY SAND, orange and tan, saturated

SILTY SAND, tan, some multicolored grains, fine grained, subrounded to rounded

SILTY CLAY, red and gray

CLAYEY SILT, rose and gray with layers of clacareous pebbles

CLAY, red, stiff, calcareous pebbles, gray veining

SANDY SILT, gray

SLIGHTLY CLAYEY SILT, gray, damp

SILTY SAND, gray, very fine grained sand, wet

RESOURCE ENGINEERING
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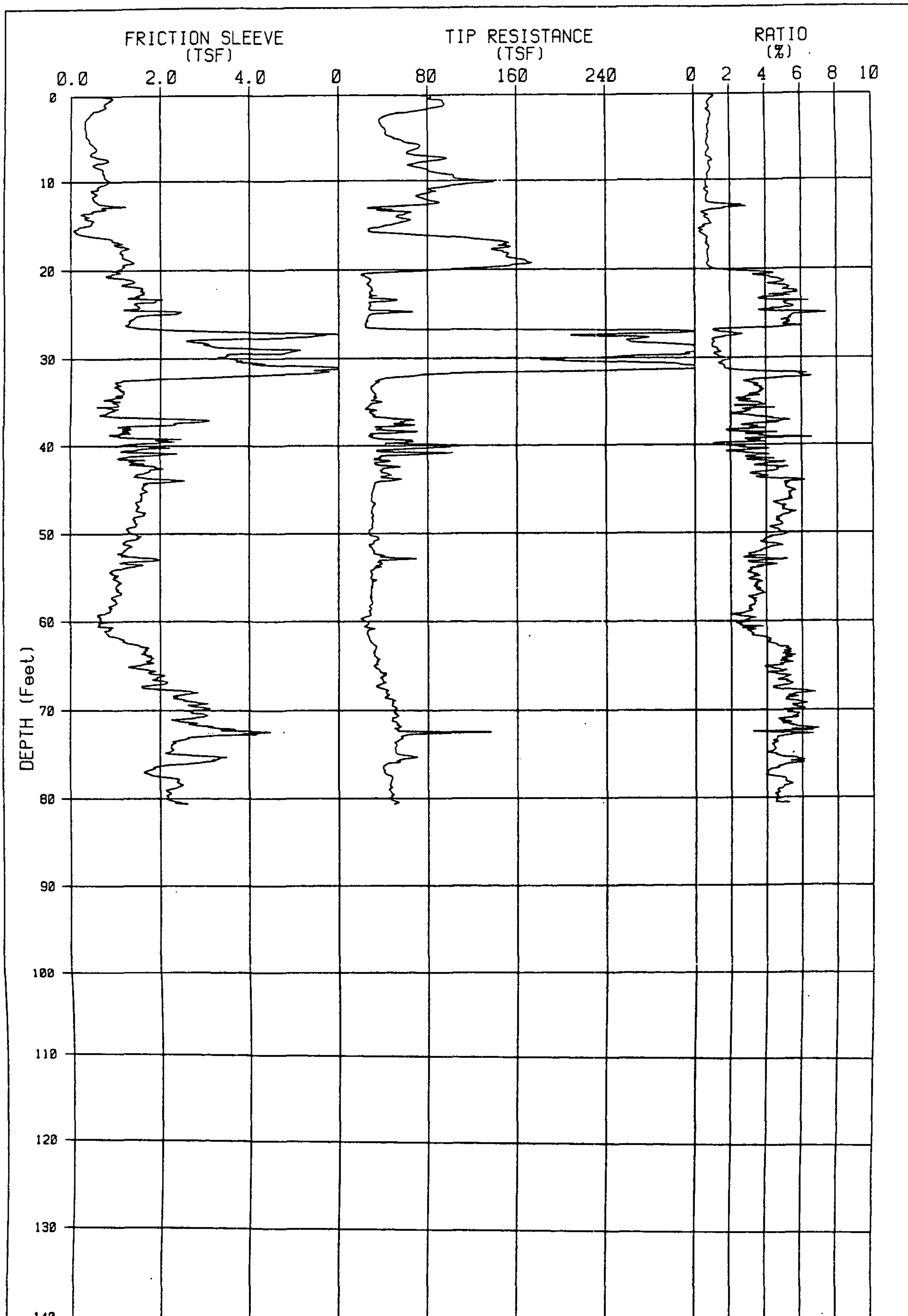
HOUSTON, TEXAS

APPENDIX 8
1986 F.I. ALLUVIAL REMNANT
ASSESSMENT COMPARISON
OF LOGGING TECHNIQUES
FRENCH LIMITED

DRAWN BY: LCS	DATE: 11-21-86	PROJECT NO.: 275-14
CHK'D BY: SLB	REVISED:	DWG.NO.: 4

Appendix 9

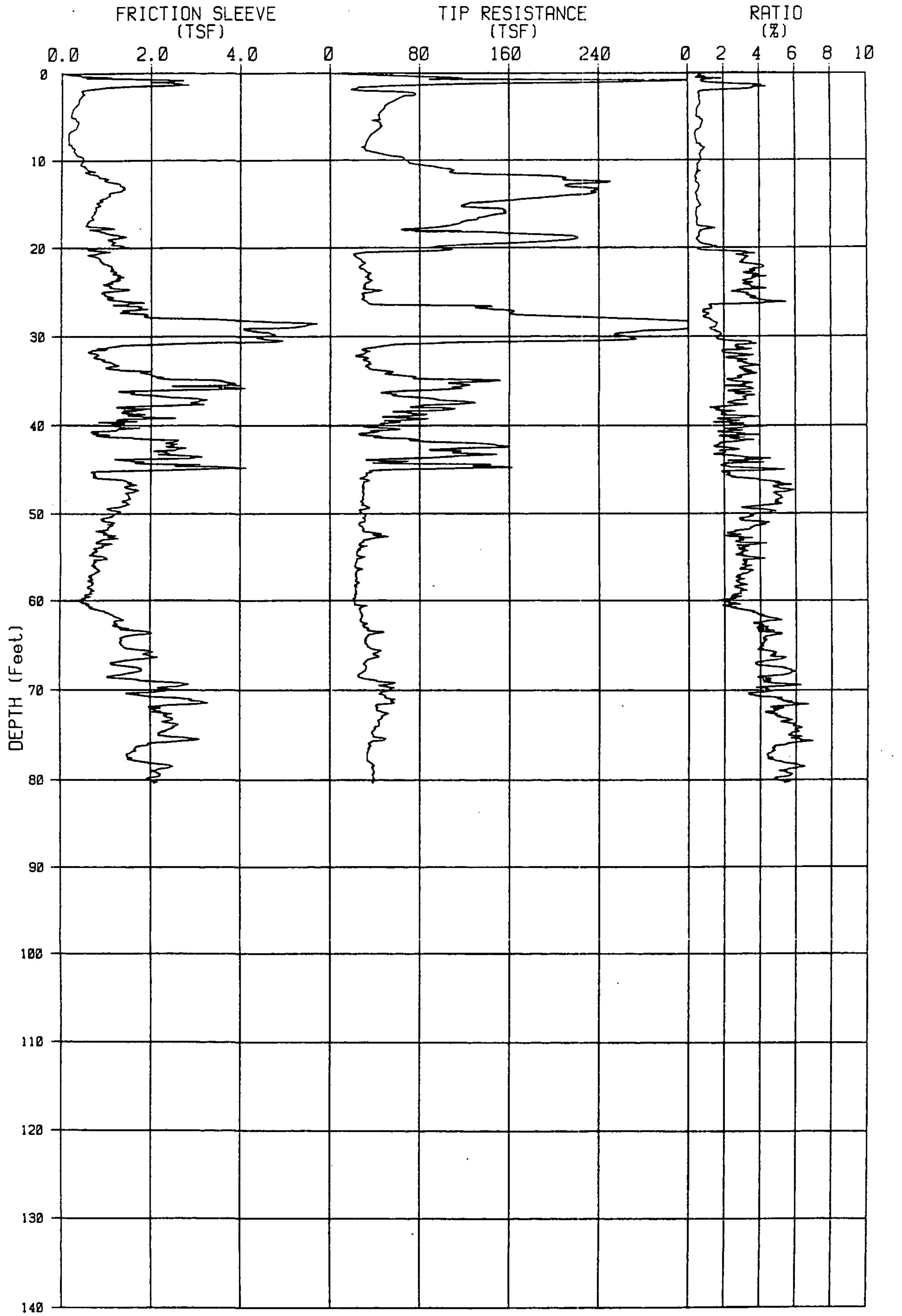
Cone Penetrometer Sounding Logs (CPT 1 through 28)



JOB NUMBER : 86-1080 CPT NUMBER : 01 DATE : 07-07-1986

ELEVATION : 0.00 CONE NUMBER: F5CKE448

FUGRO INTER, INC



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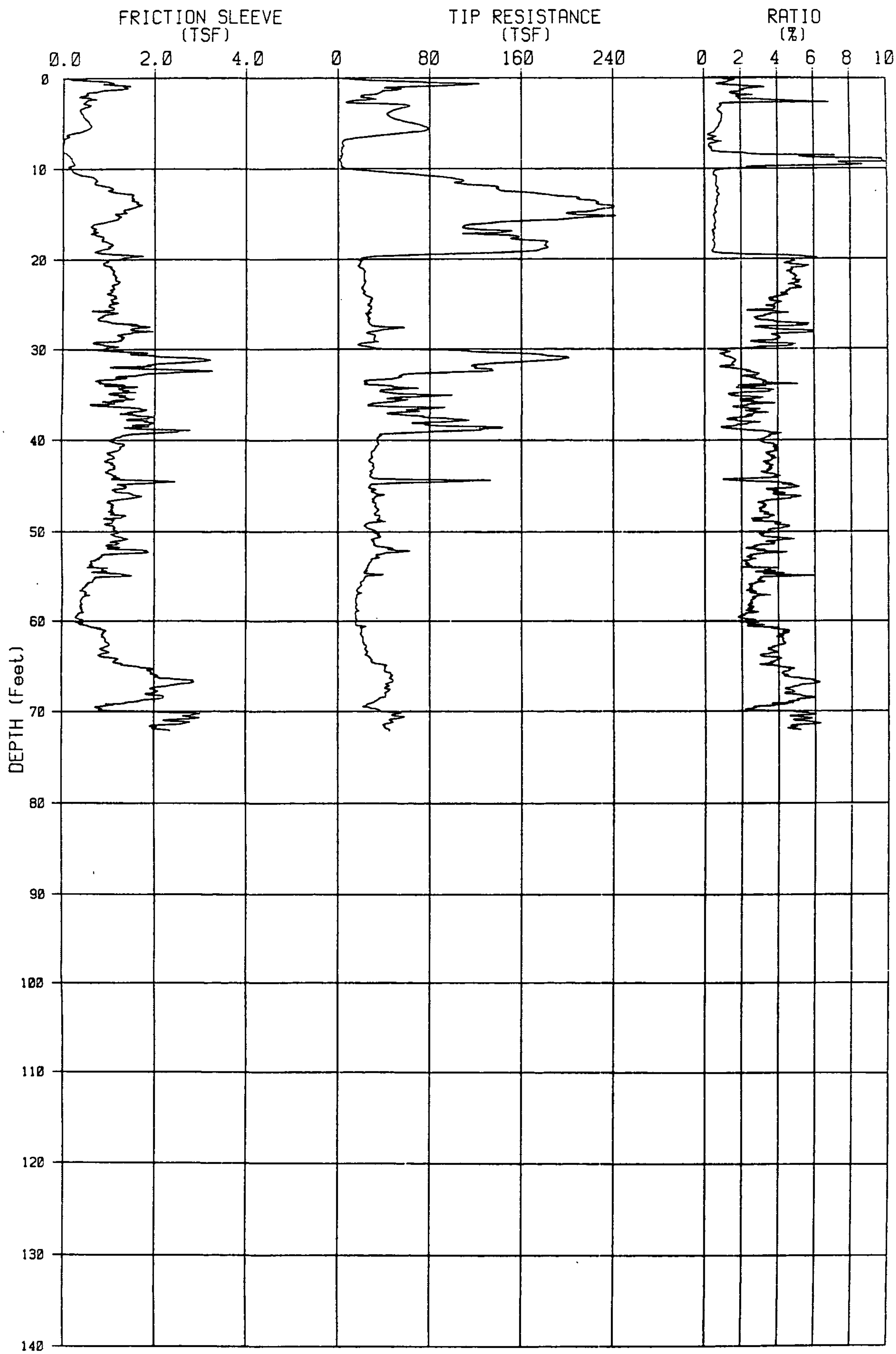
FUGRO INTER, INC



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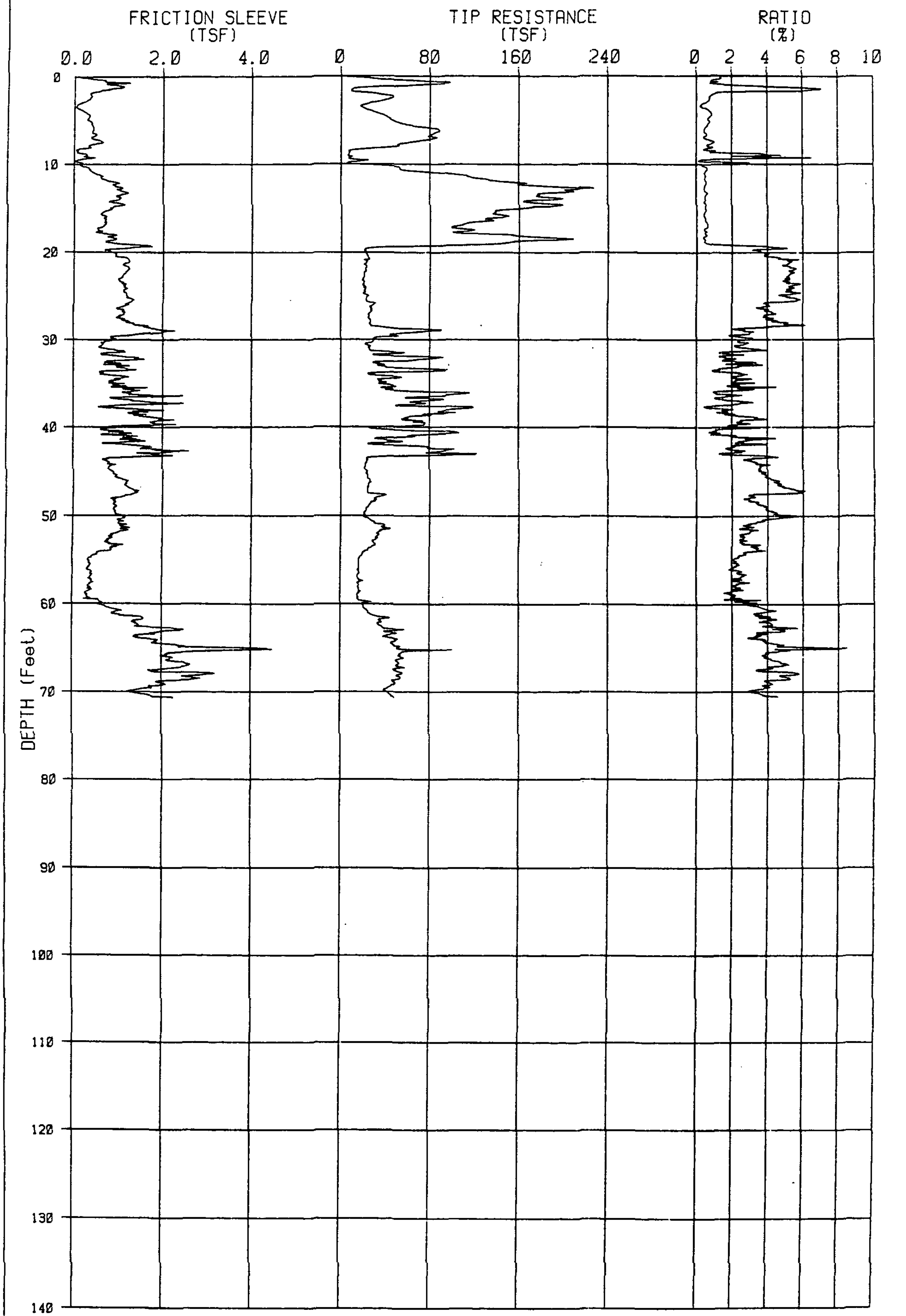
ELEVATION : 0.00 CONE NUMBER: F10CKE301

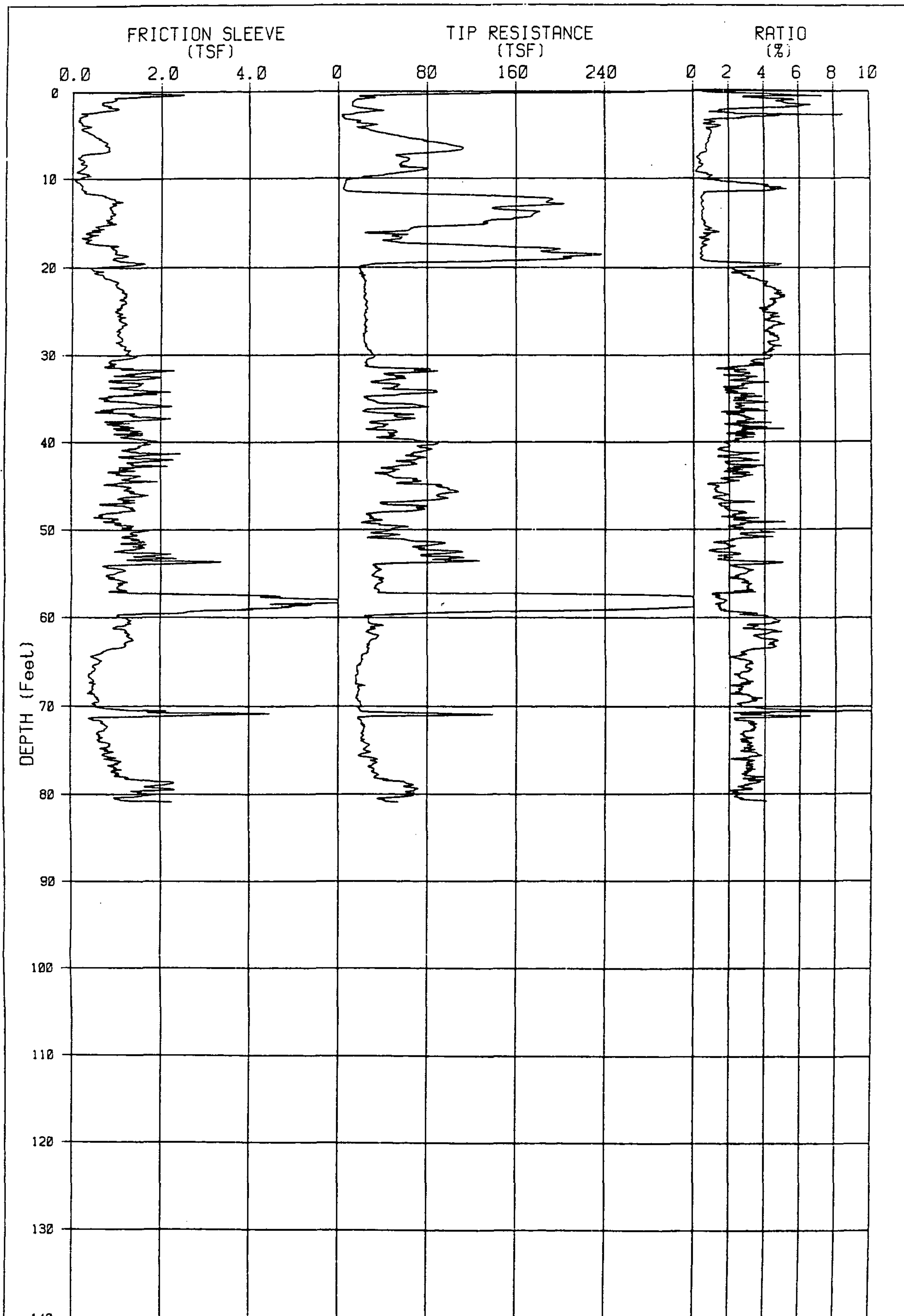
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 04 DATE : 07-07-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

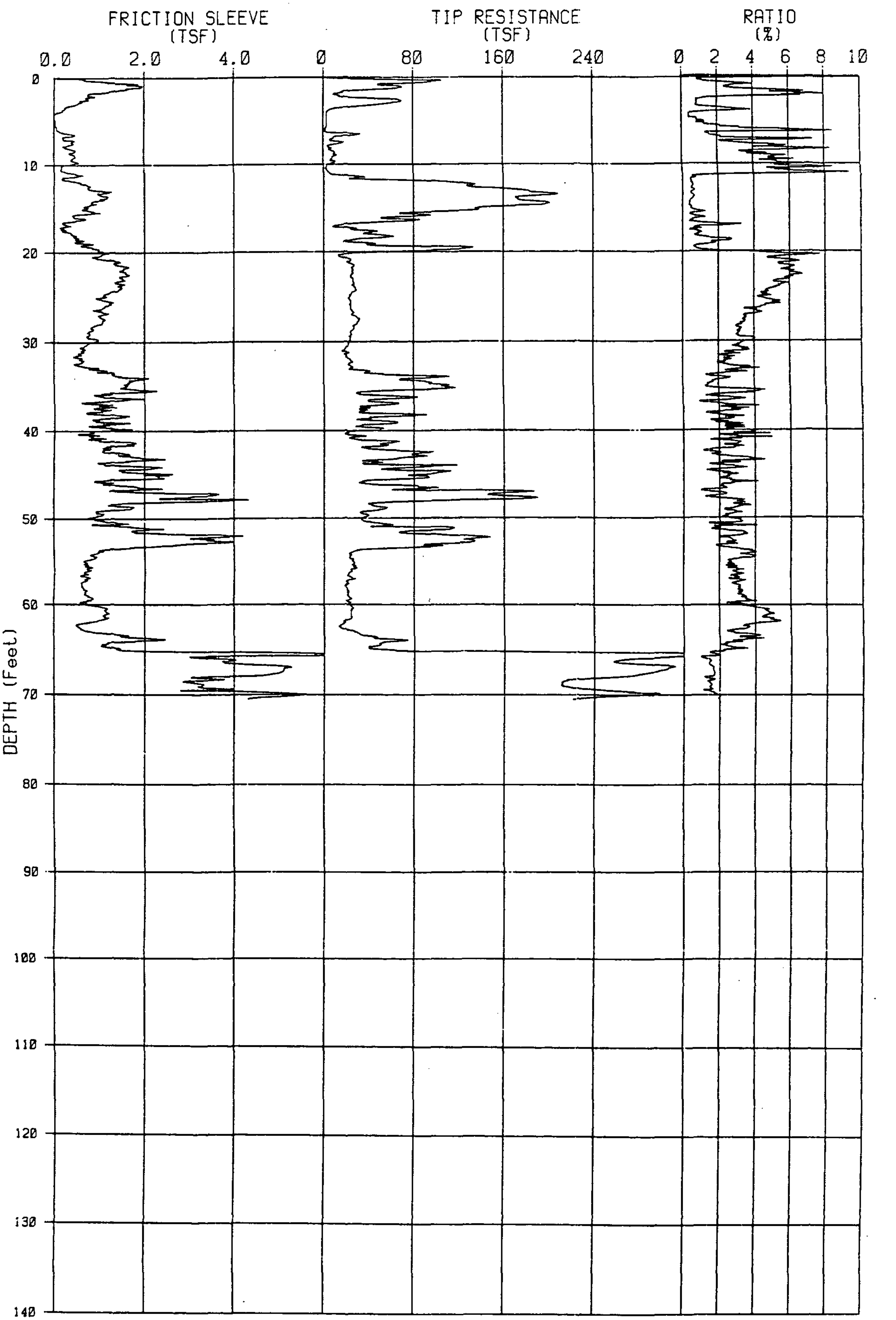
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 05 DATE : 07-07-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

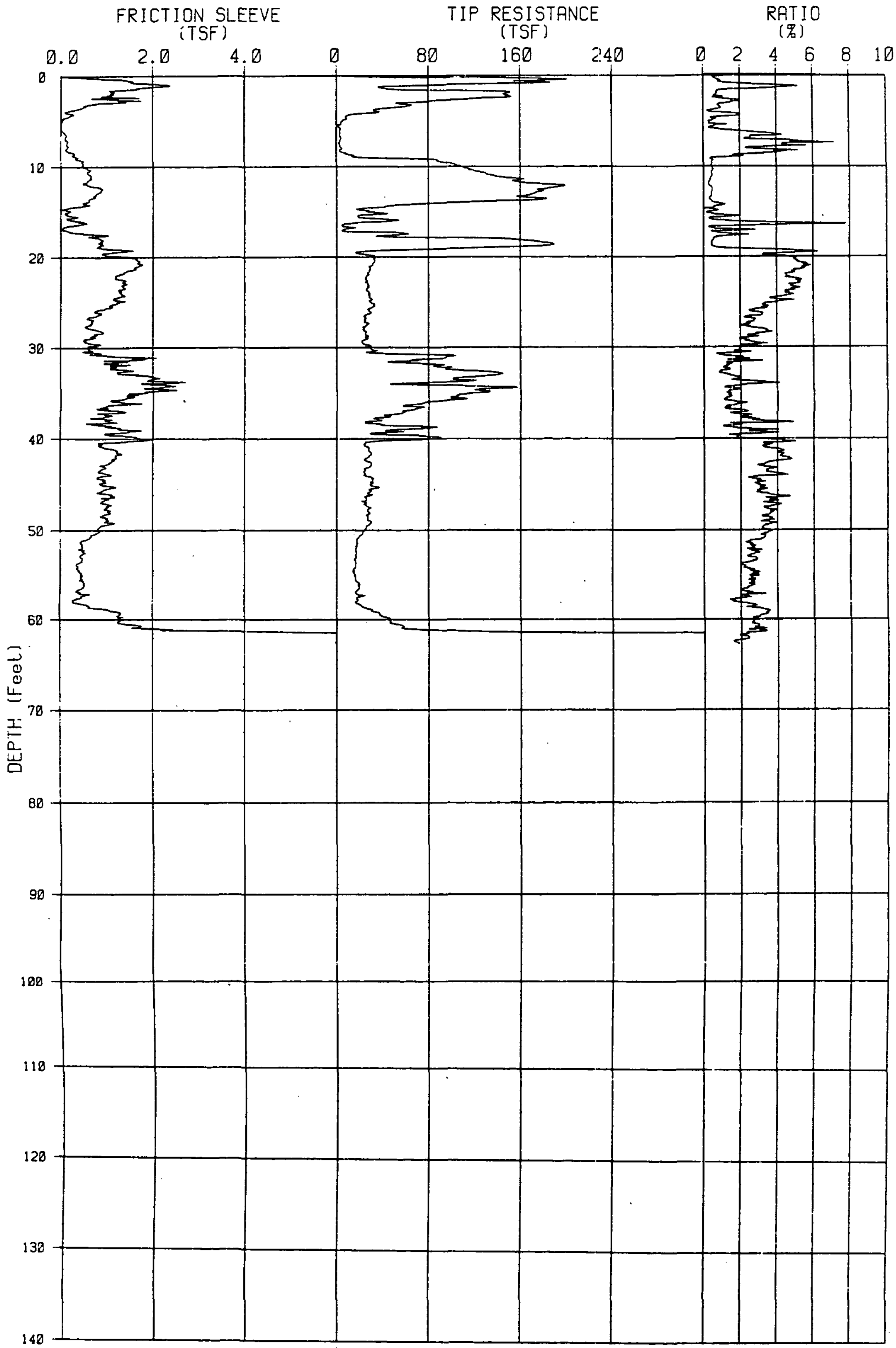
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 06 DATE : 07-07-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

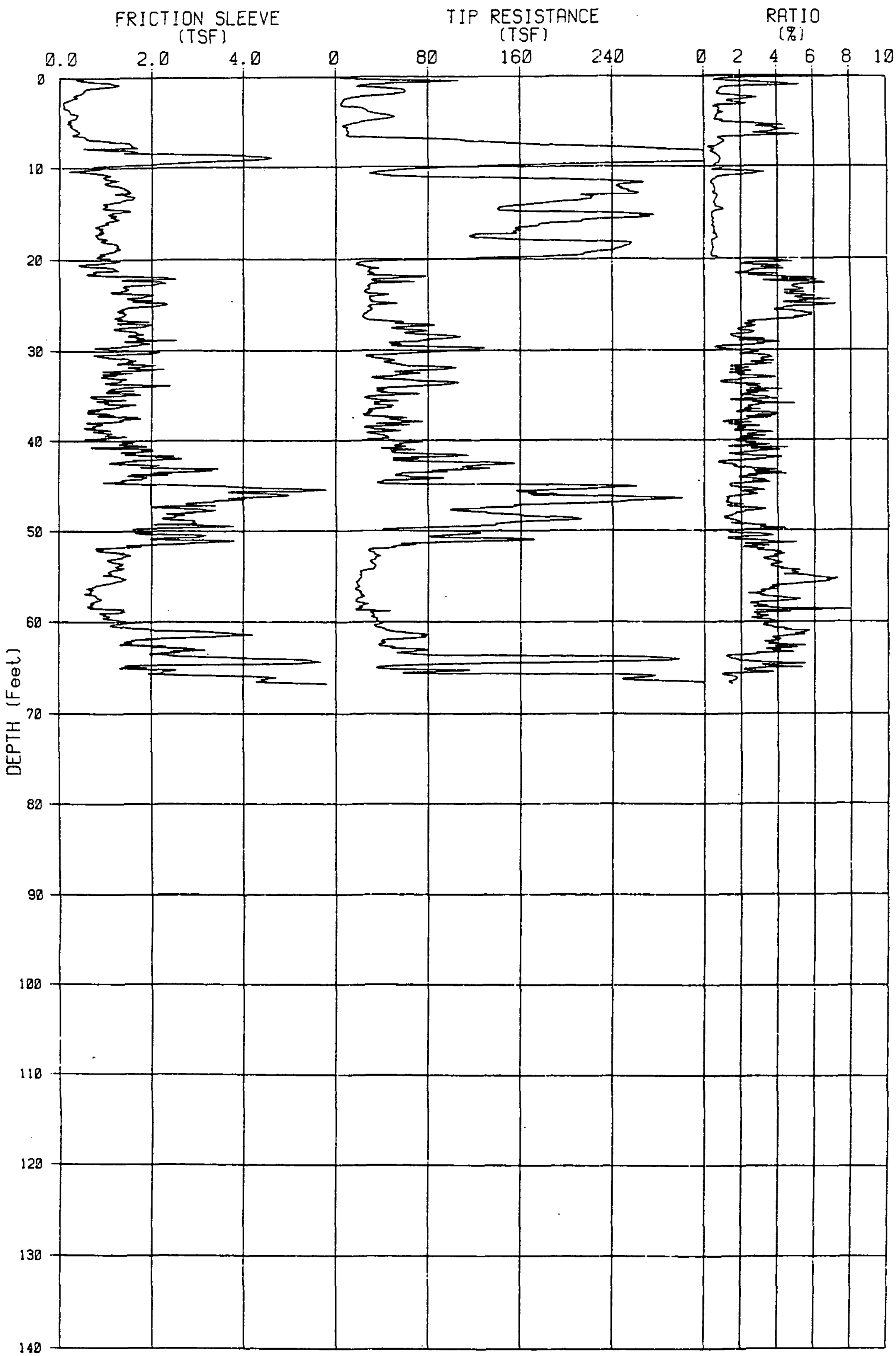
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 07 DATE : 07-07-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

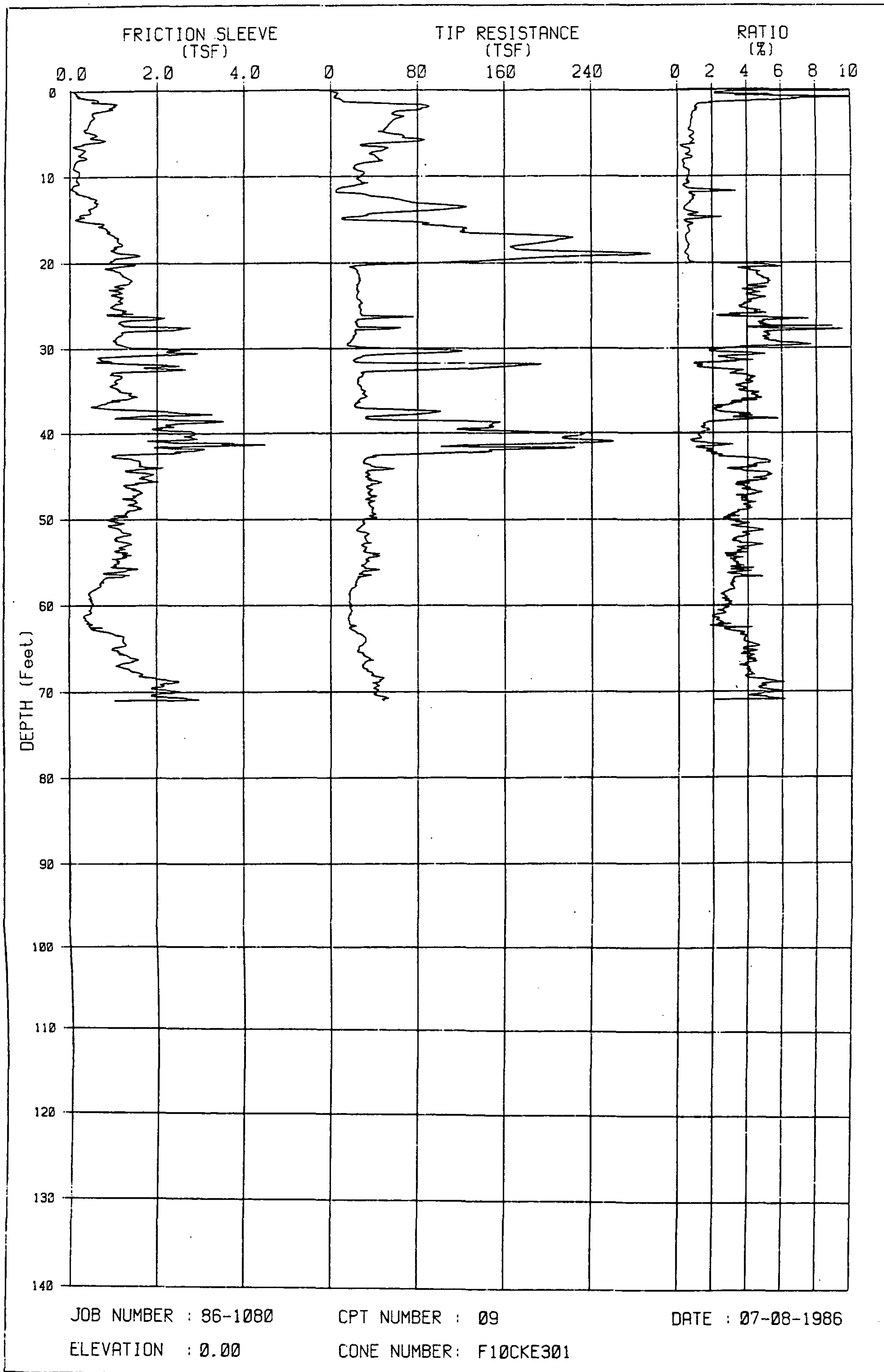
FUGRO INTER, INC



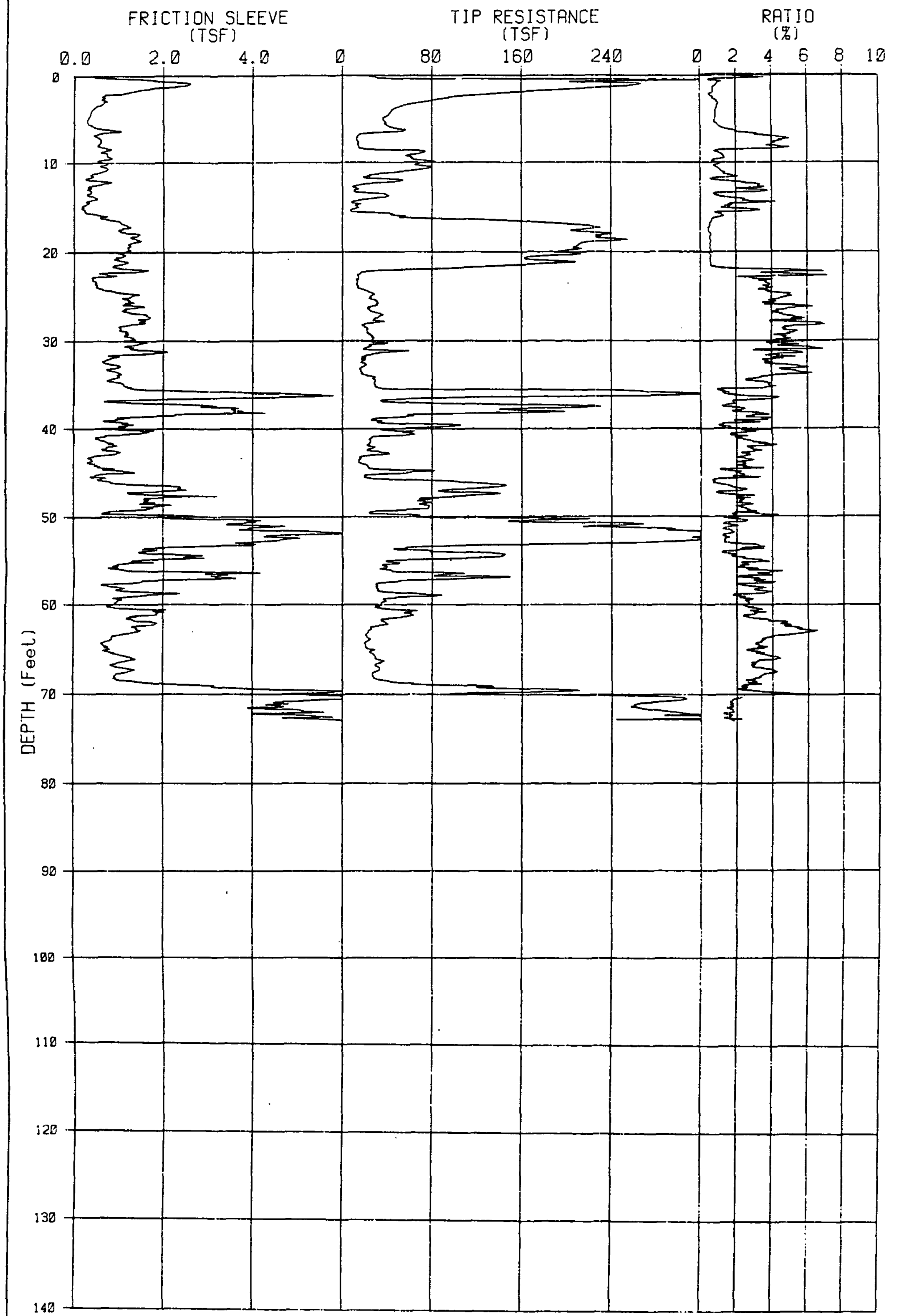
JOB NUMBER : 86-1080   CPT NUMBER : 08   DATE : 07-08-1986

ELEVATION : 0.00   CONE NUMBER: F10CKE301

FUGRO INTER, INC



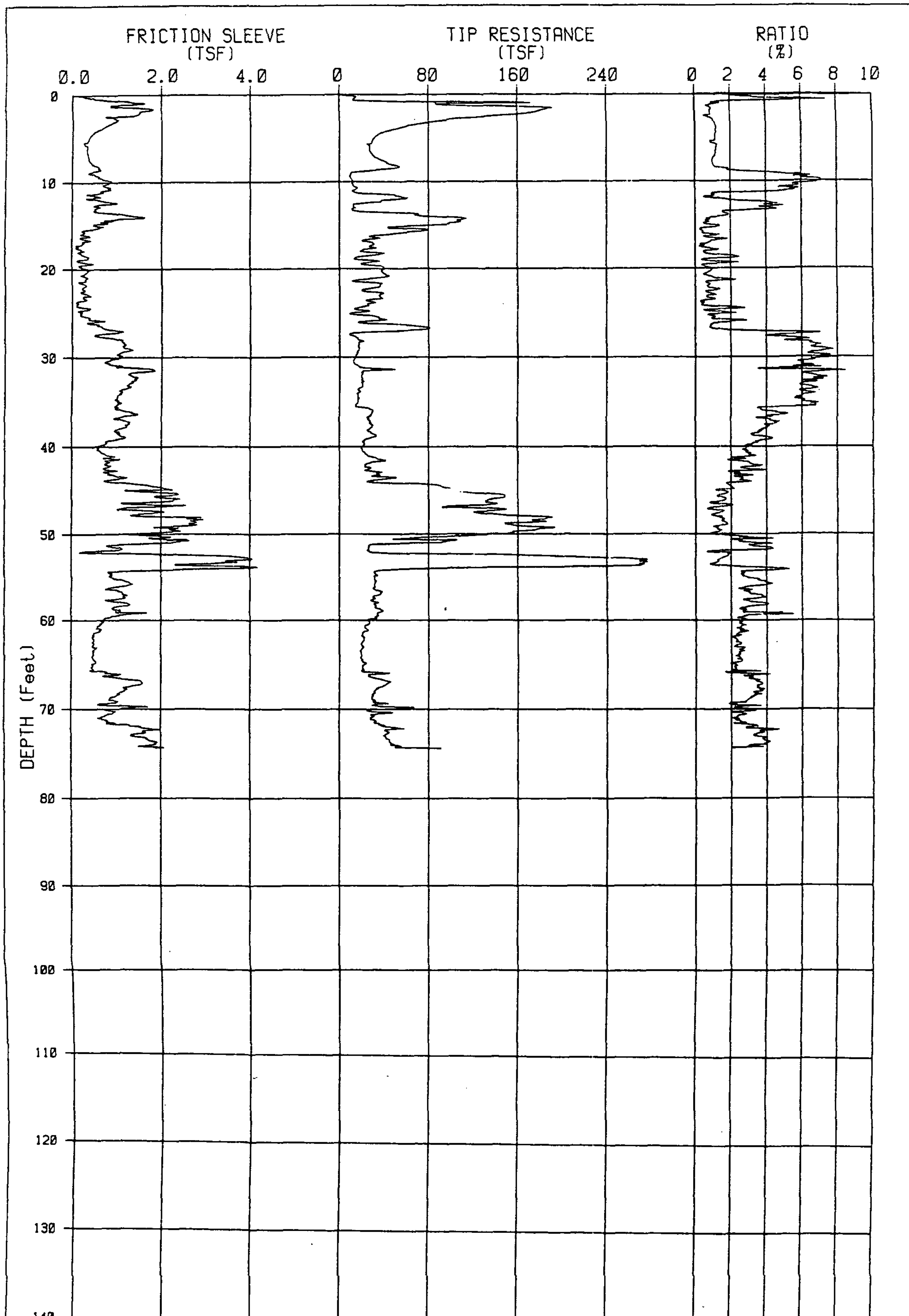
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 10 DATE : 07-08-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

FUGRO INTER, INC



JOB NUMBER : 86-1080

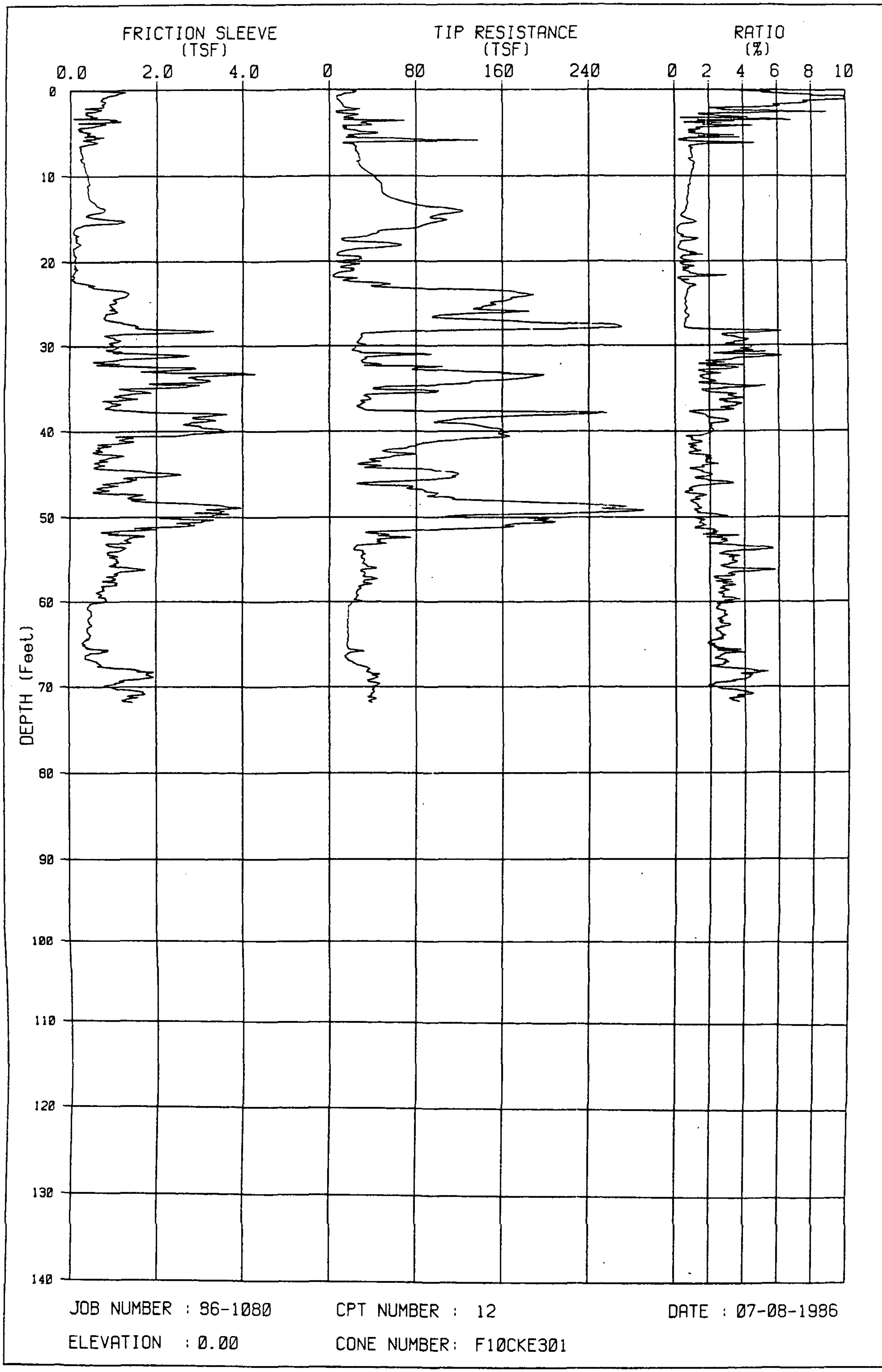
CPT NUMBER : 11

DATE : 07-08-1986

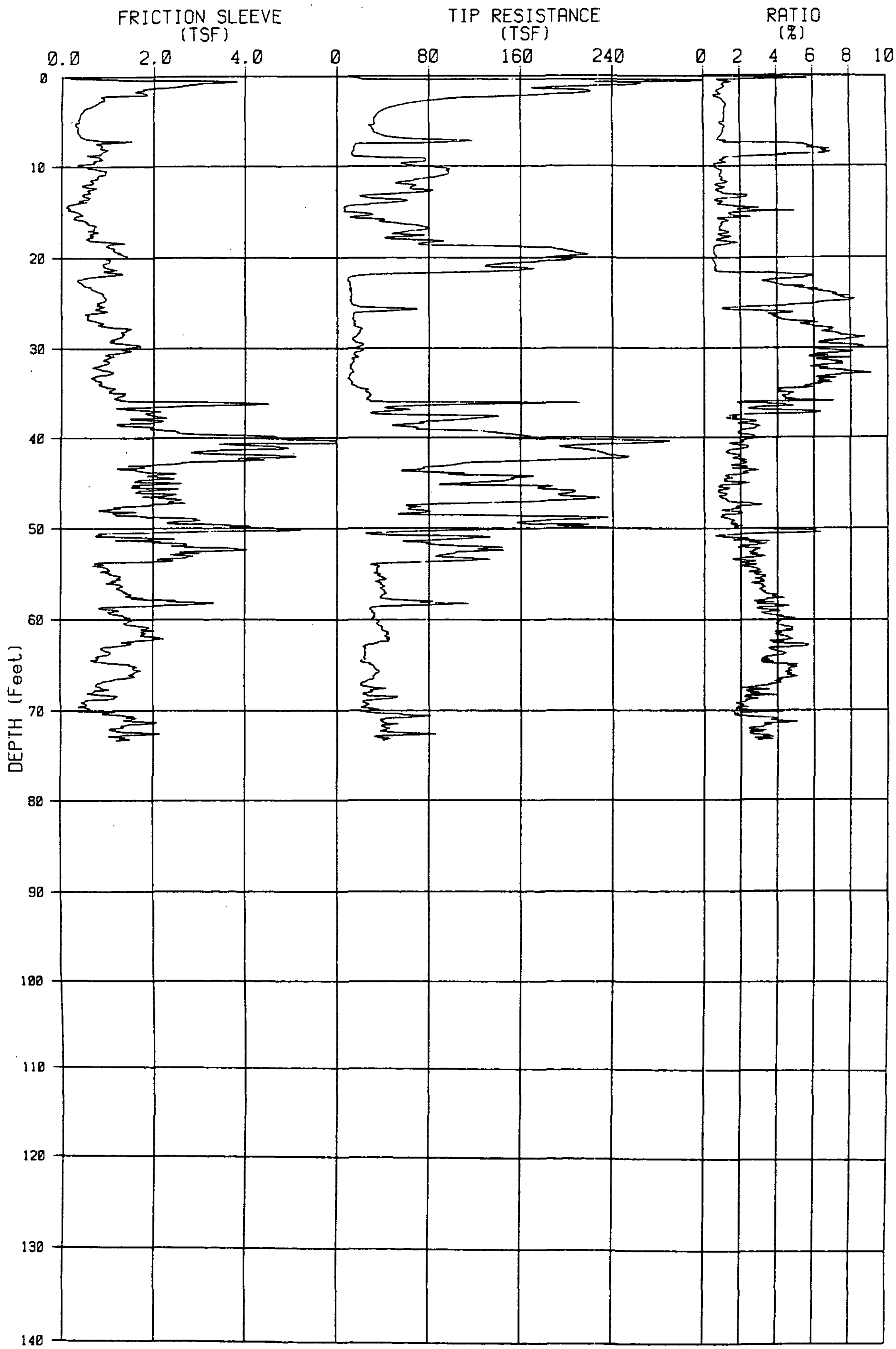
ELEVATION : 0.00

CONE NUMBER: F10CKE301

FUGRO INTER, INC



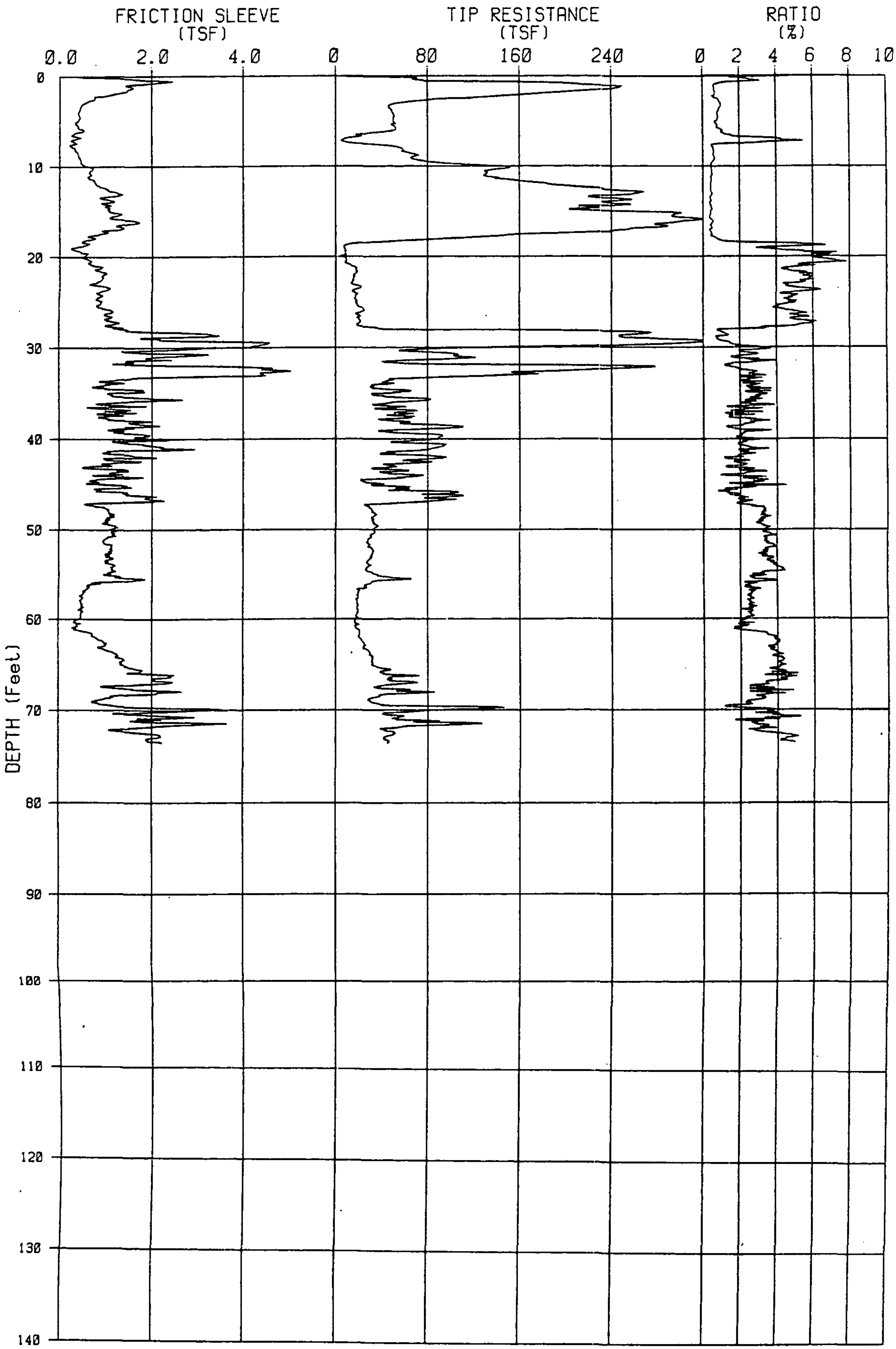
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 13 DATE : 07-08-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

FUGRO INTER, INC



JOB NUMBER : 86-1080

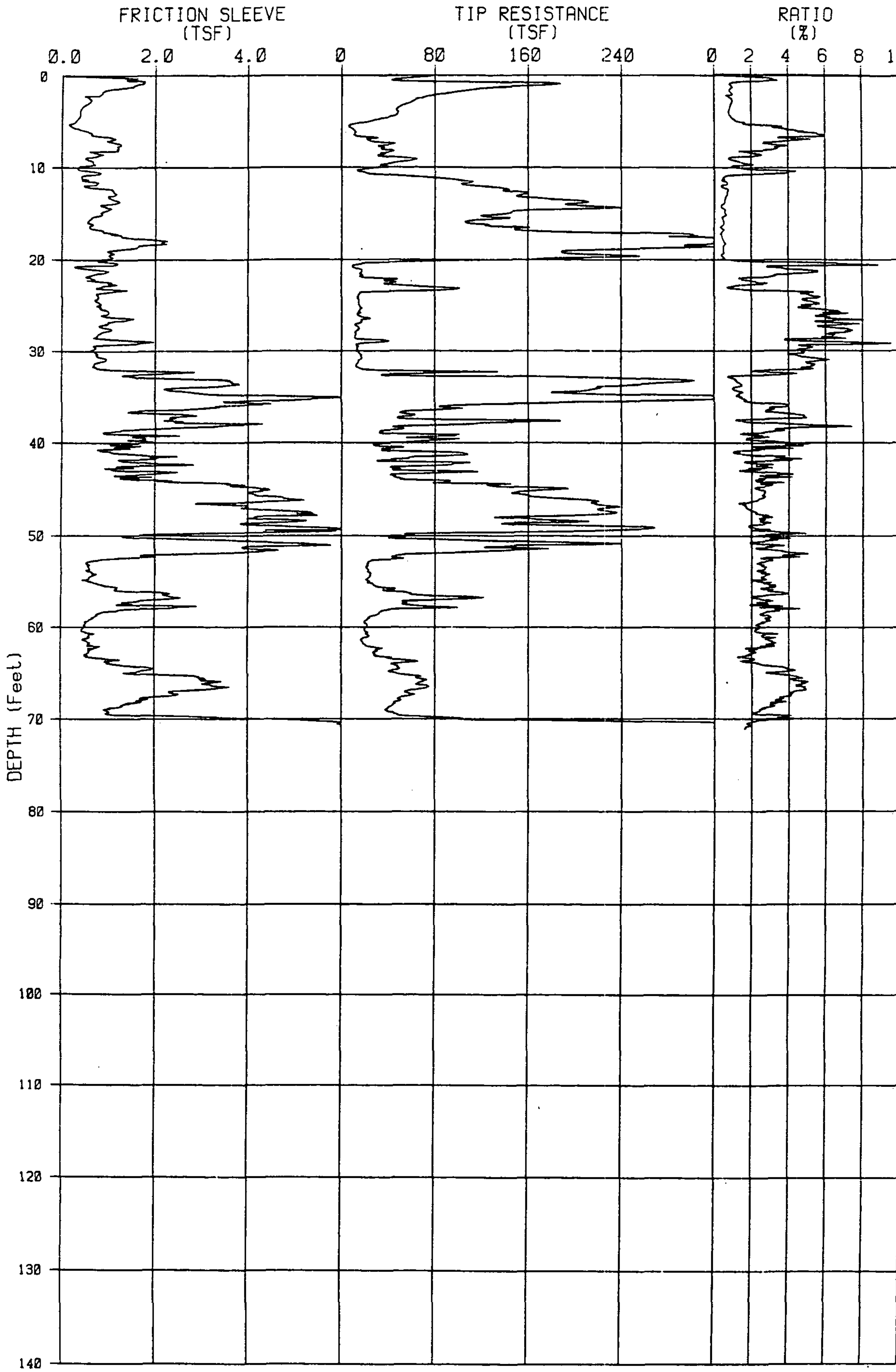
CPT NUMBER : 14

DATE : 07-09-1986

ELEVATION : 0.00

CONE NUMBER: F10CKE301

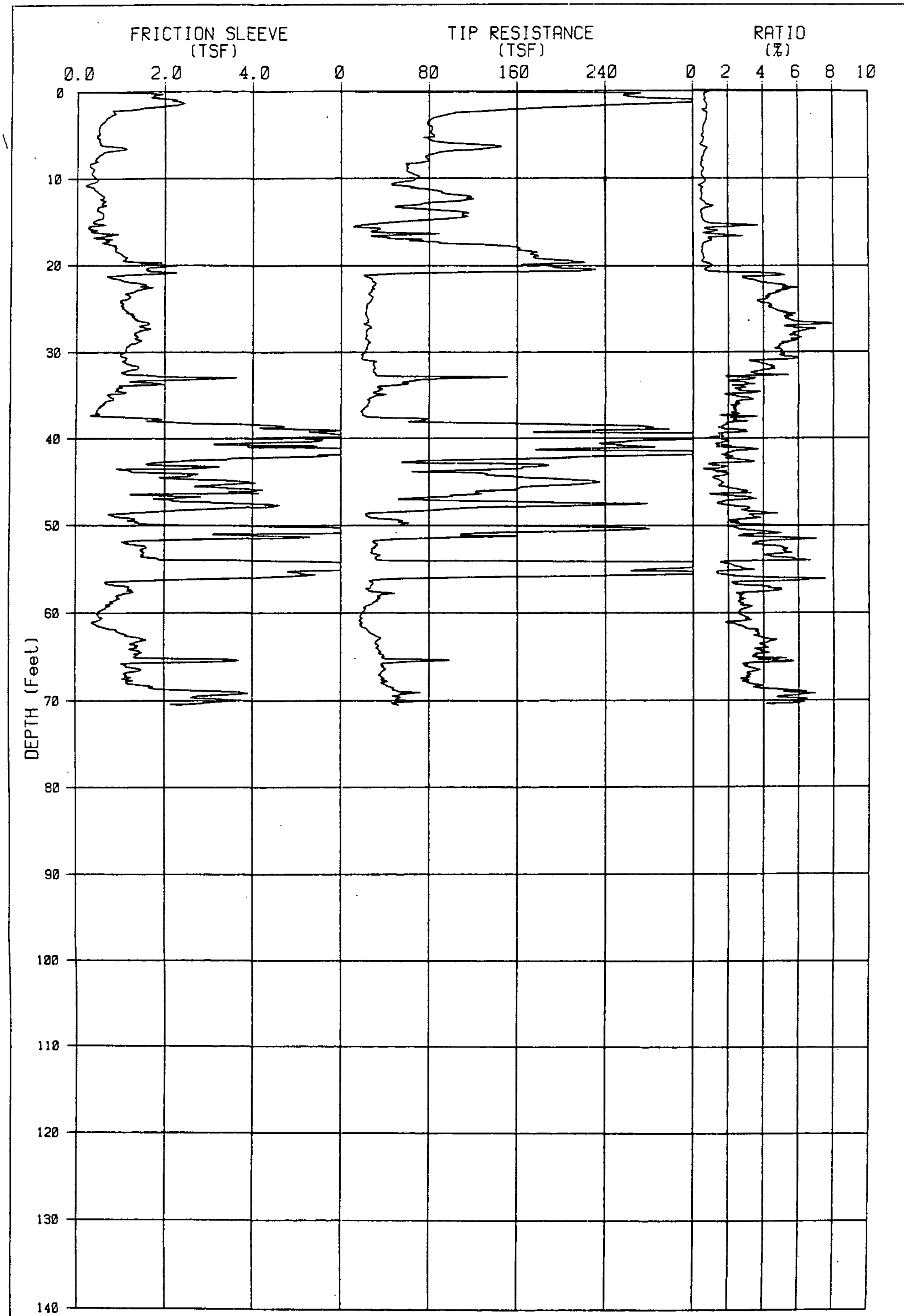
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 15 DATE : 07-09-1986

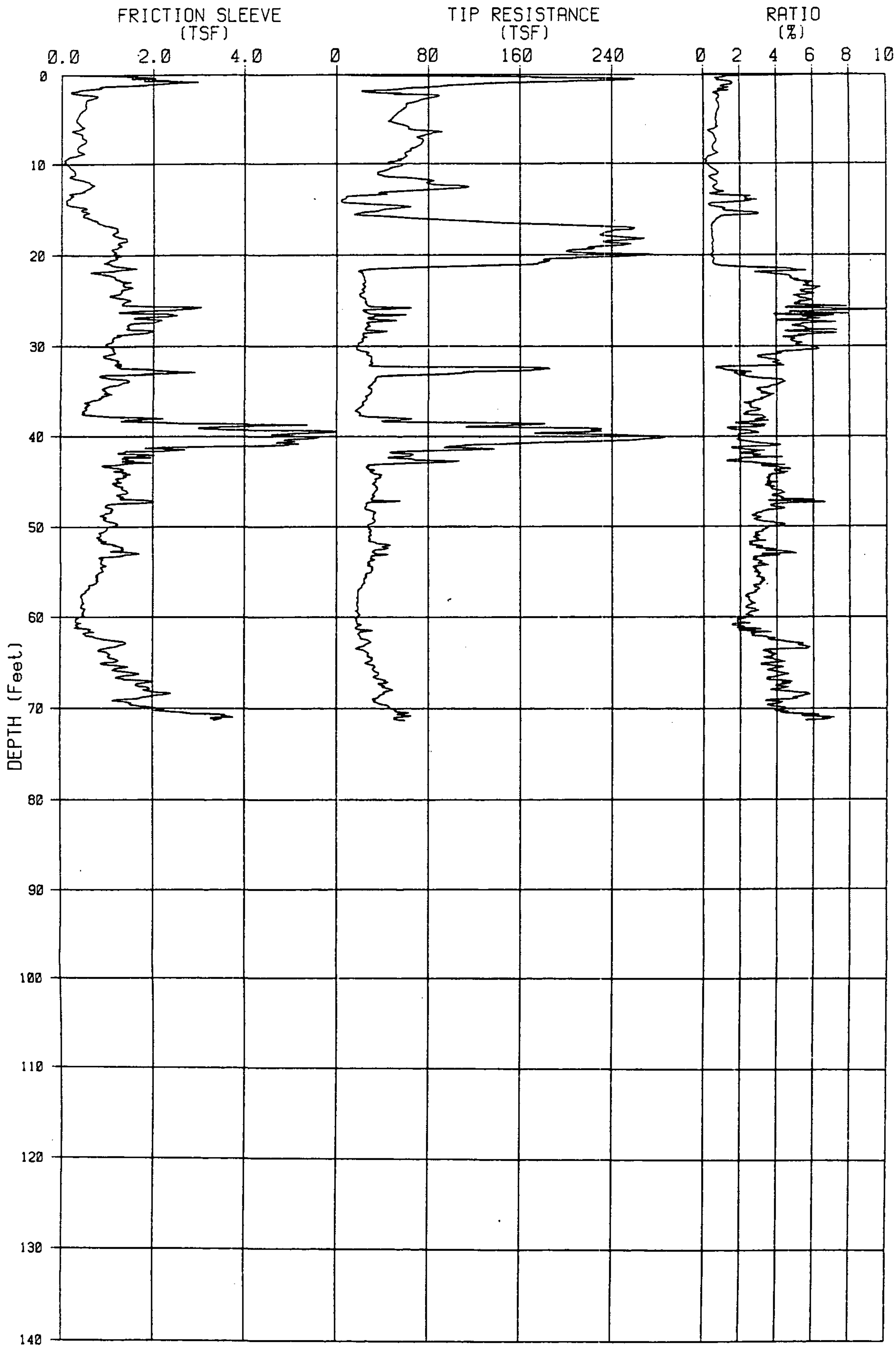
ELEVATION : 0.00 CONE NUMBER: F10CKE301

FUGRO INTER, INC



JOB NUMBER : 86-1080
CPT NUMBER : 16
DATE : 07-09-1986
ELEVATION : 0.00
CONE NUMBER: F10CKE301

FUGRO INTER, INC



JOB NUMBER : 86-1080

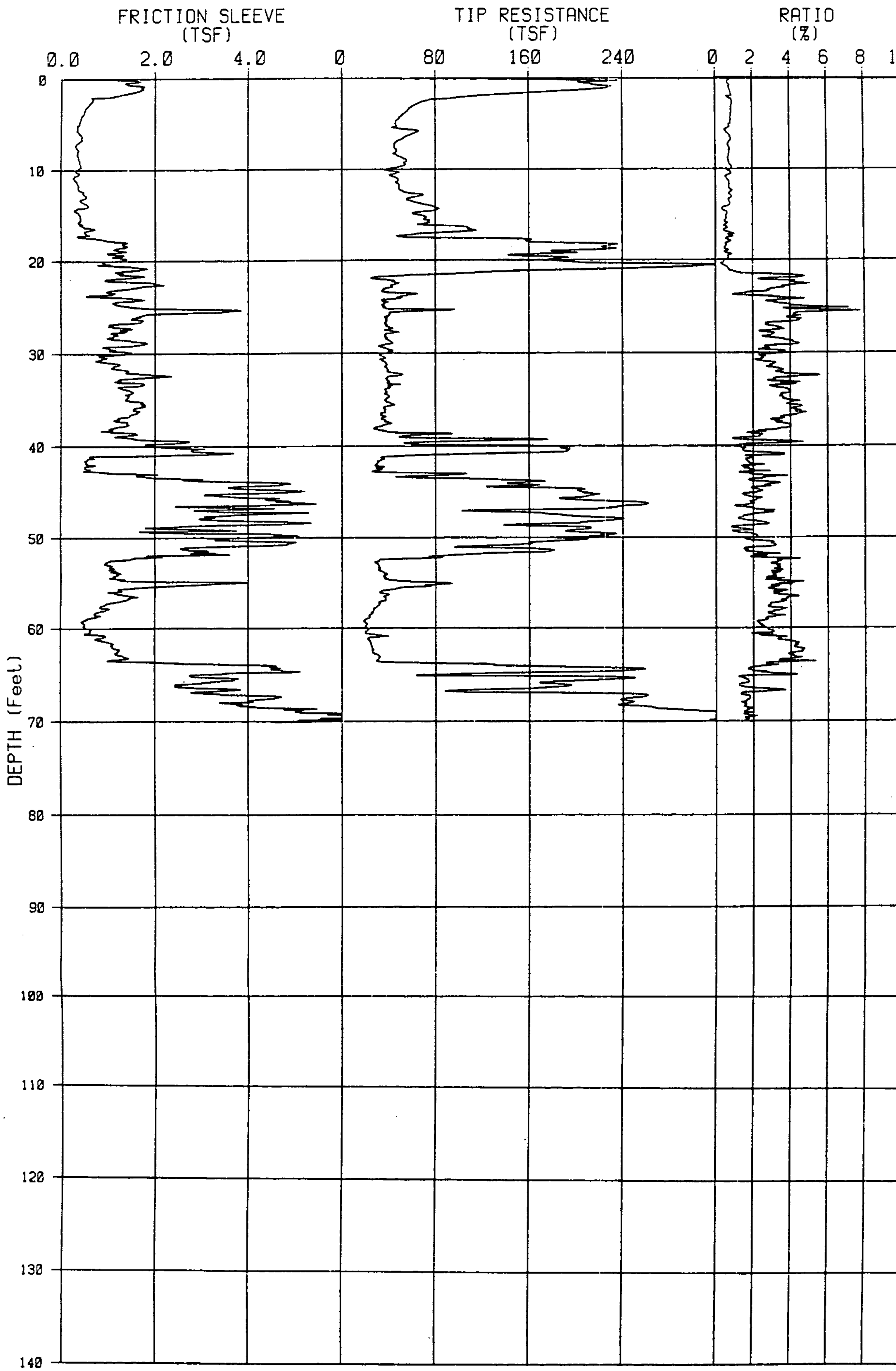
CPT NUMBER : 17

DATE : 07-09-1986

ELEVATION : 0.00

CONE NUMBER: F10CKE301

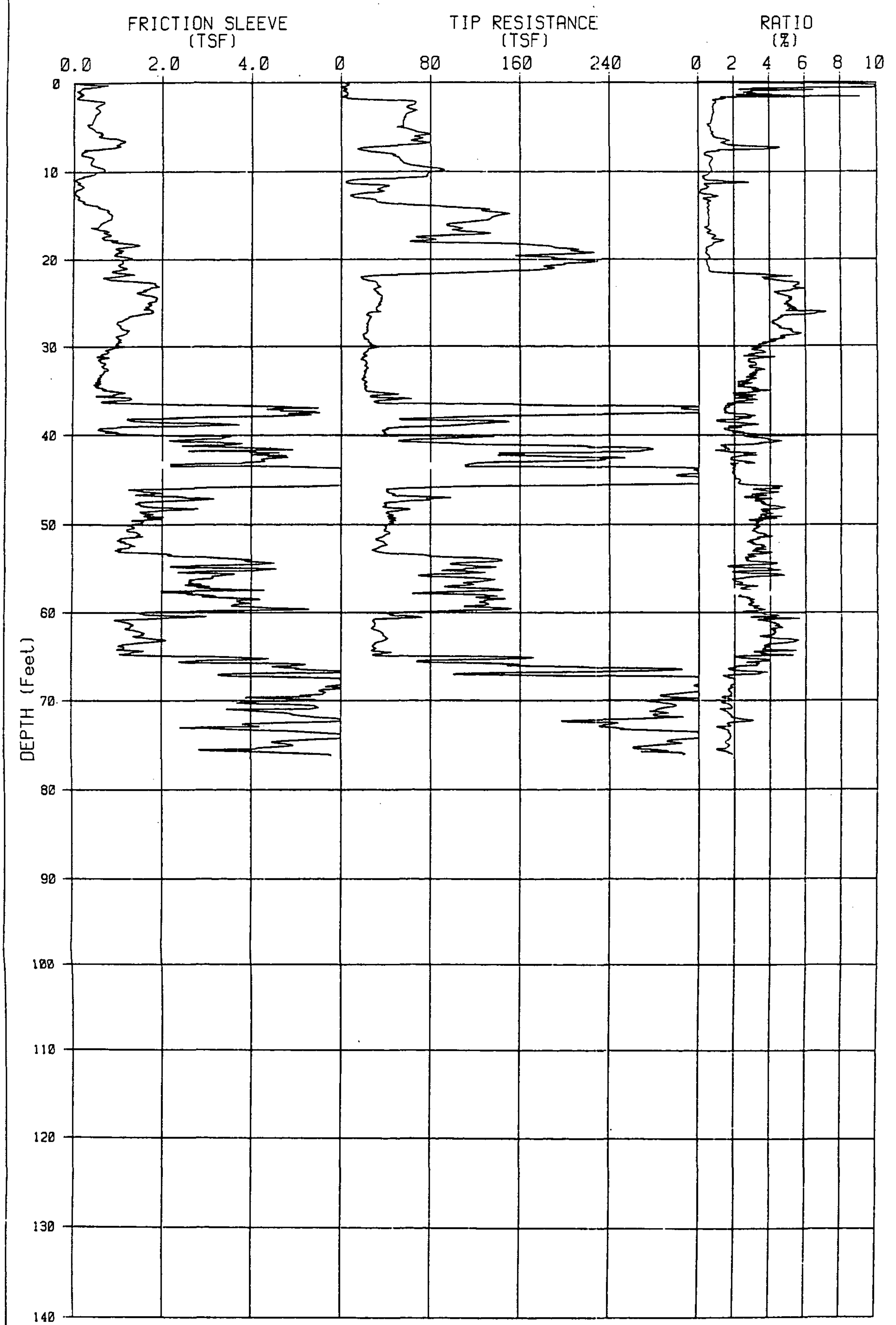
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 18 DATE : 07-09-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

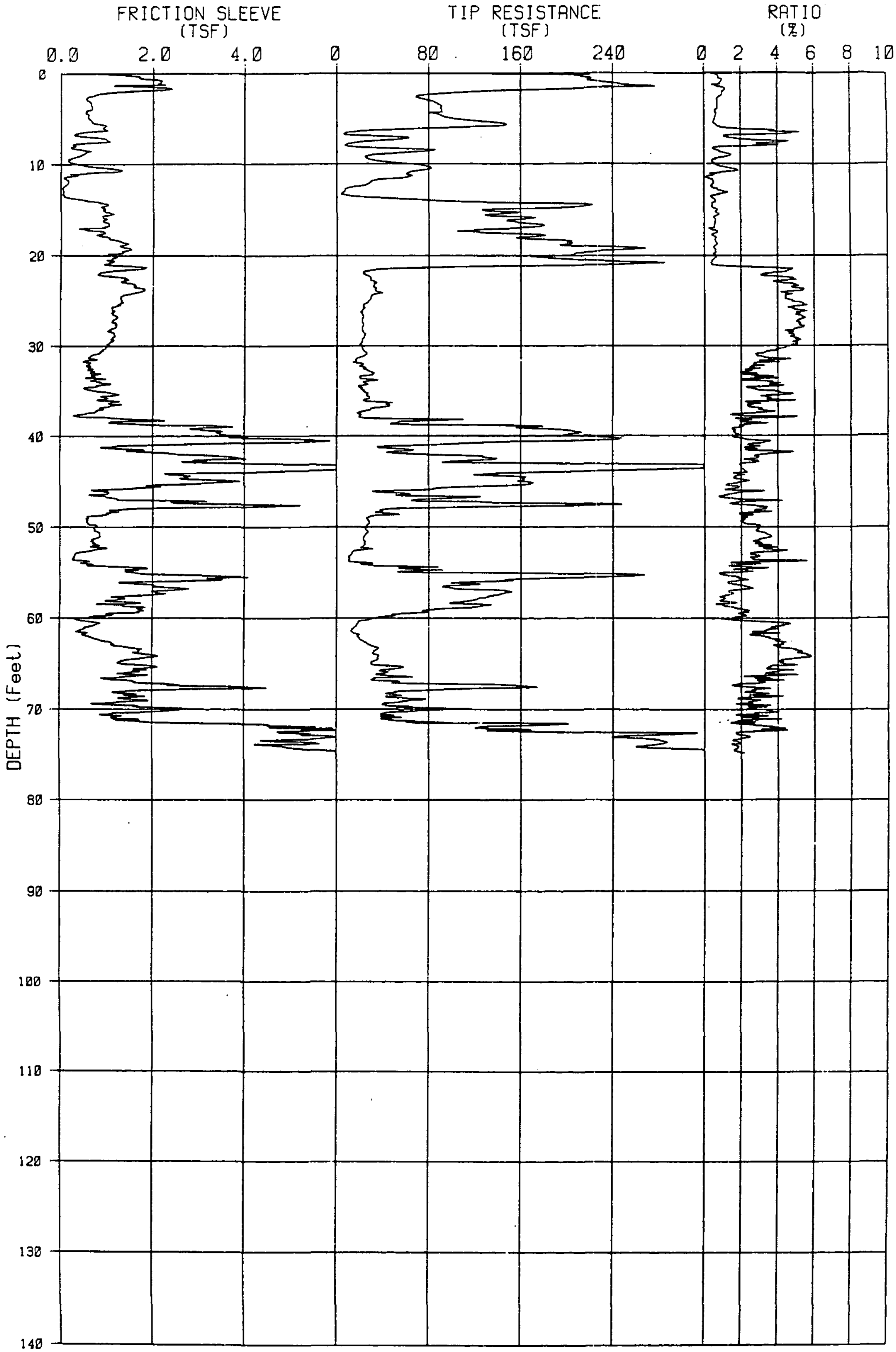
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 19 DATE : 07-09-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

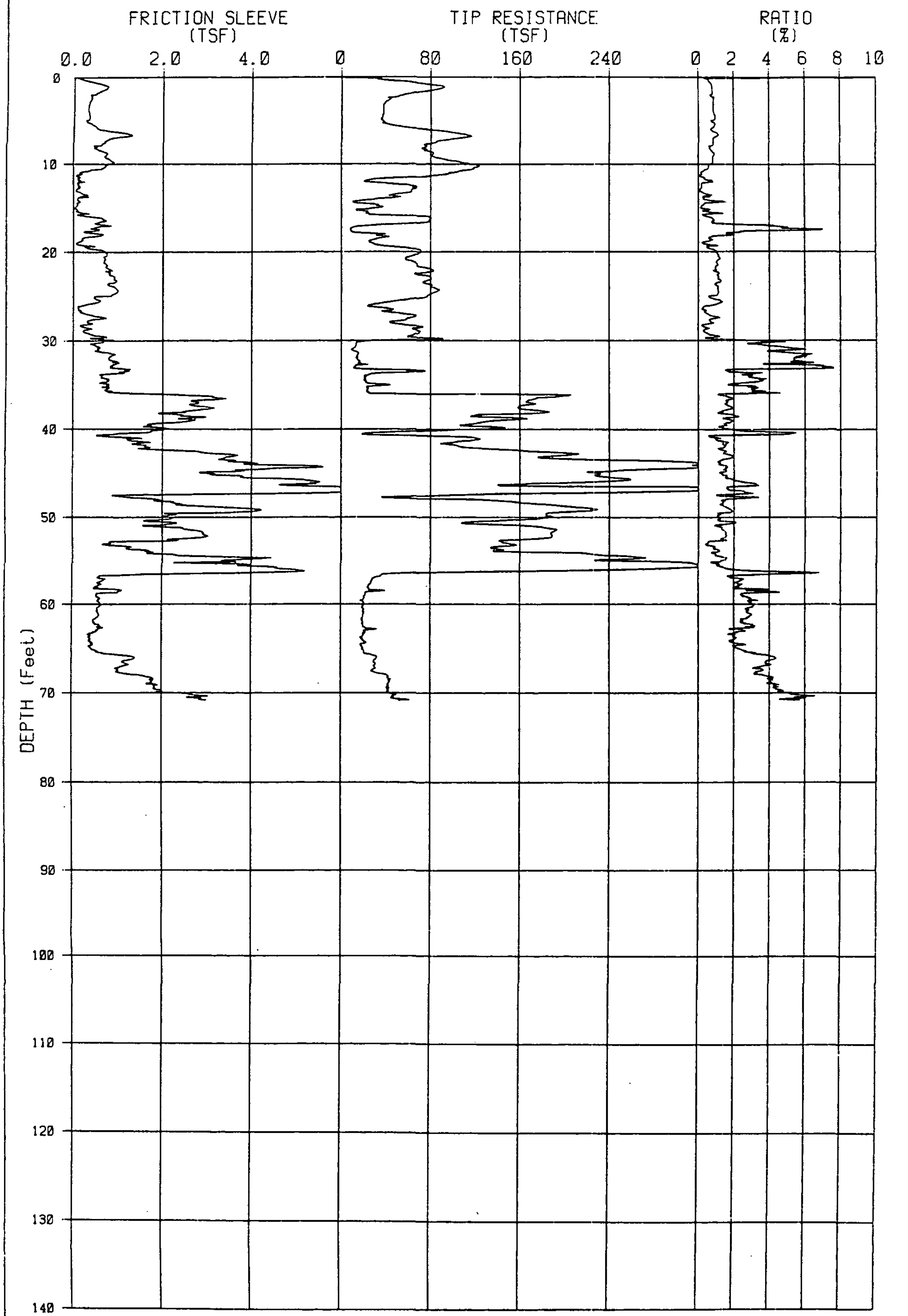
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 20 DATE : 07-09-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

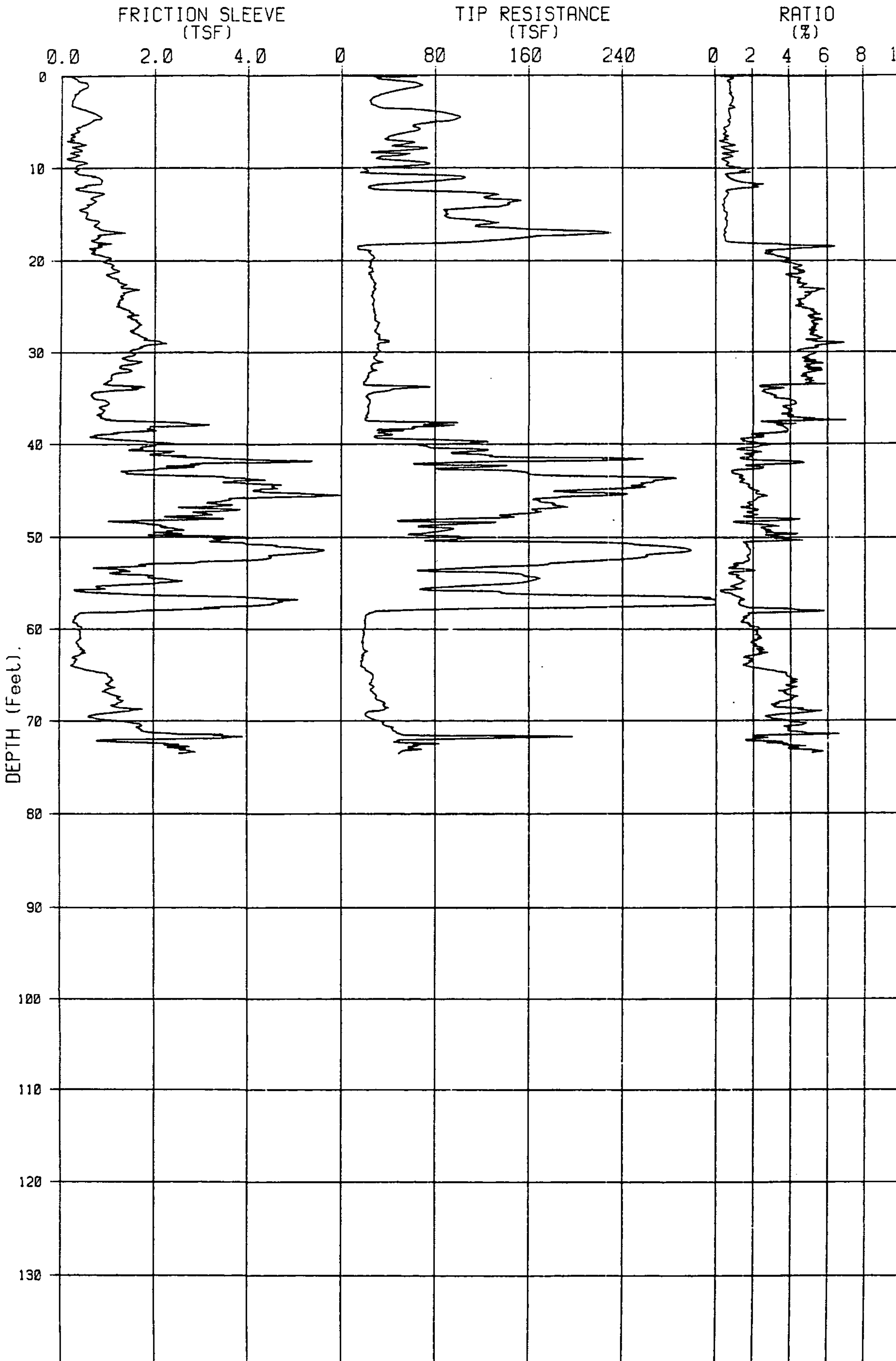
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 21 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

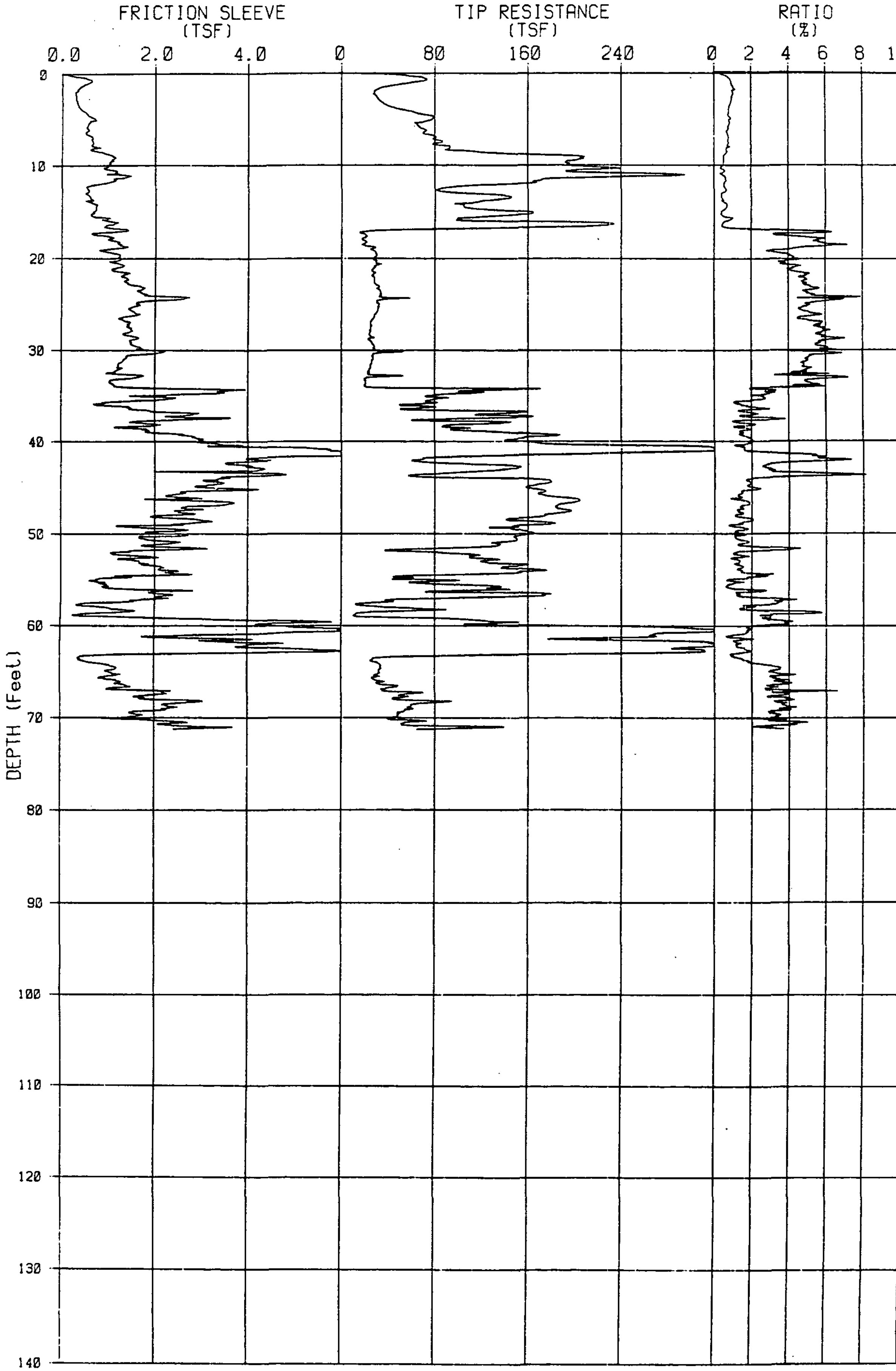
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 22 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

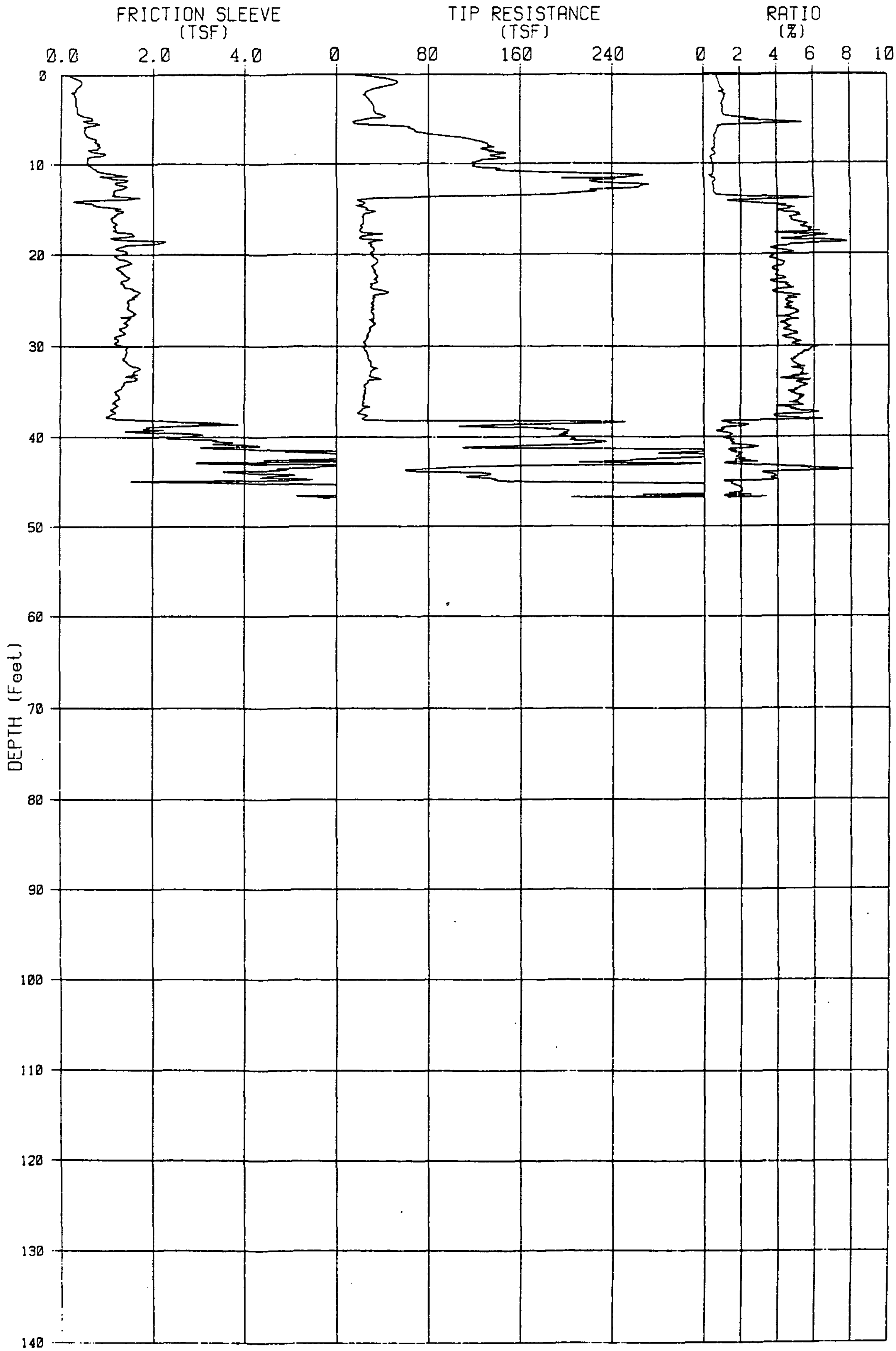
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 23 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

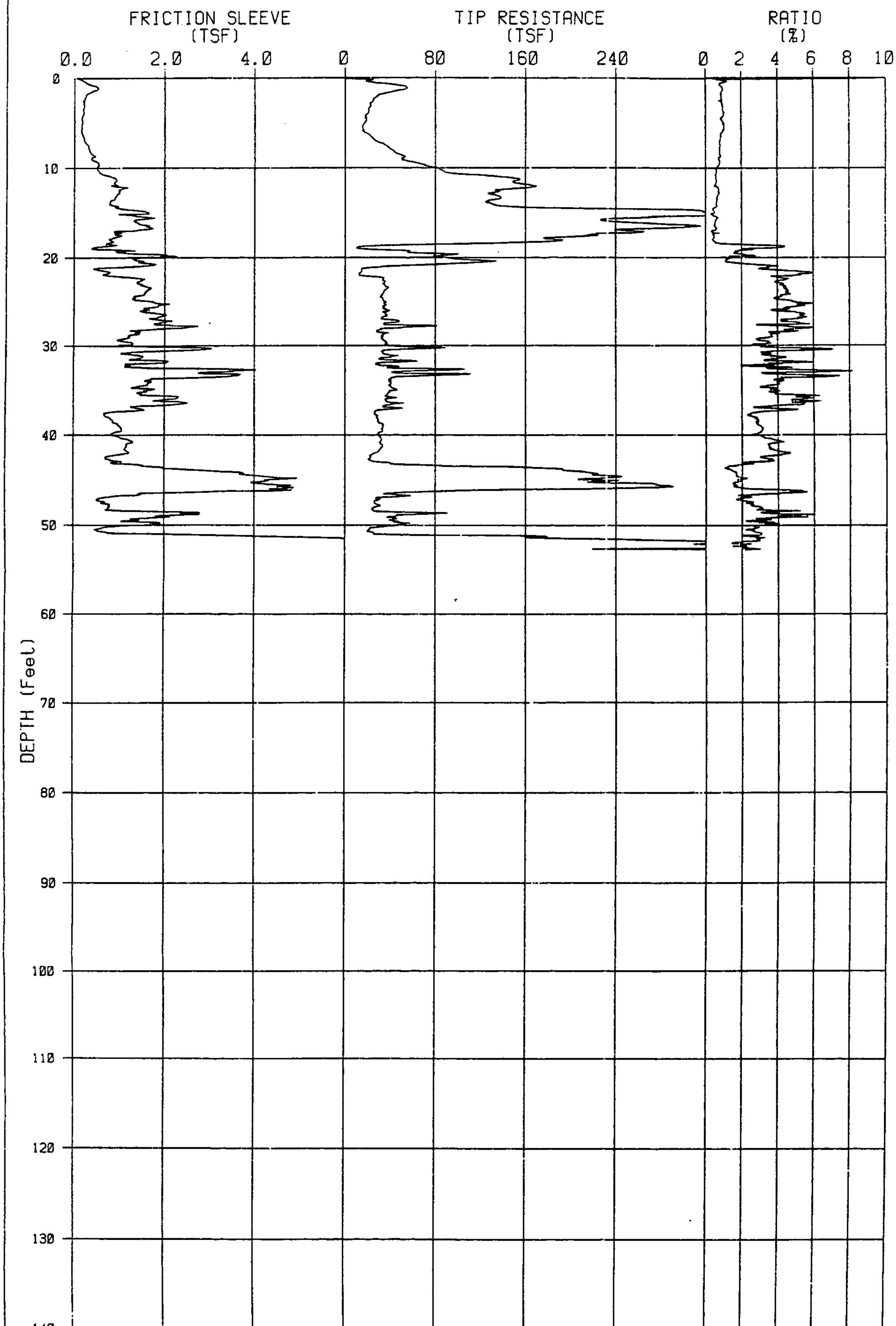
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 24 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

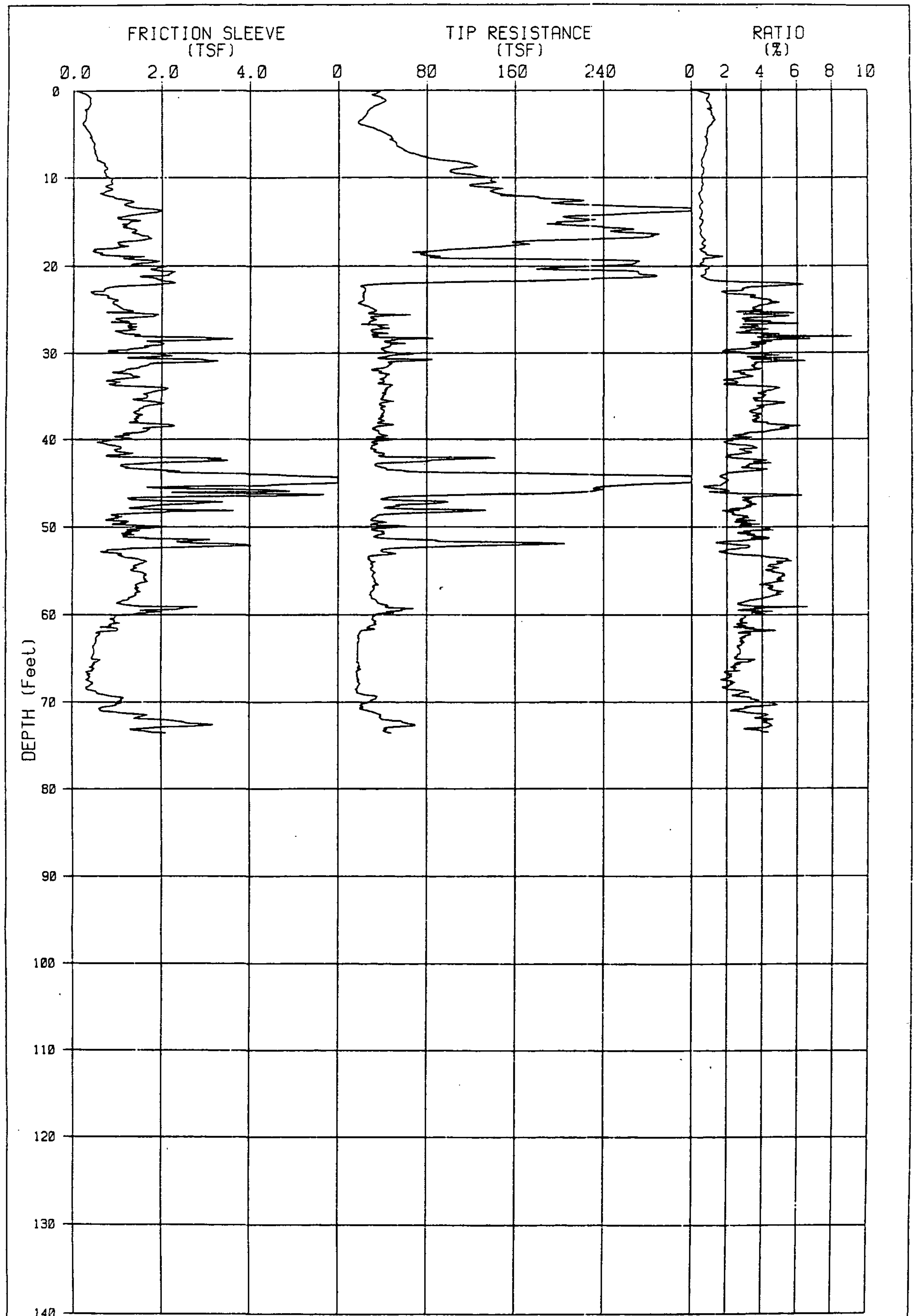
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 25 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

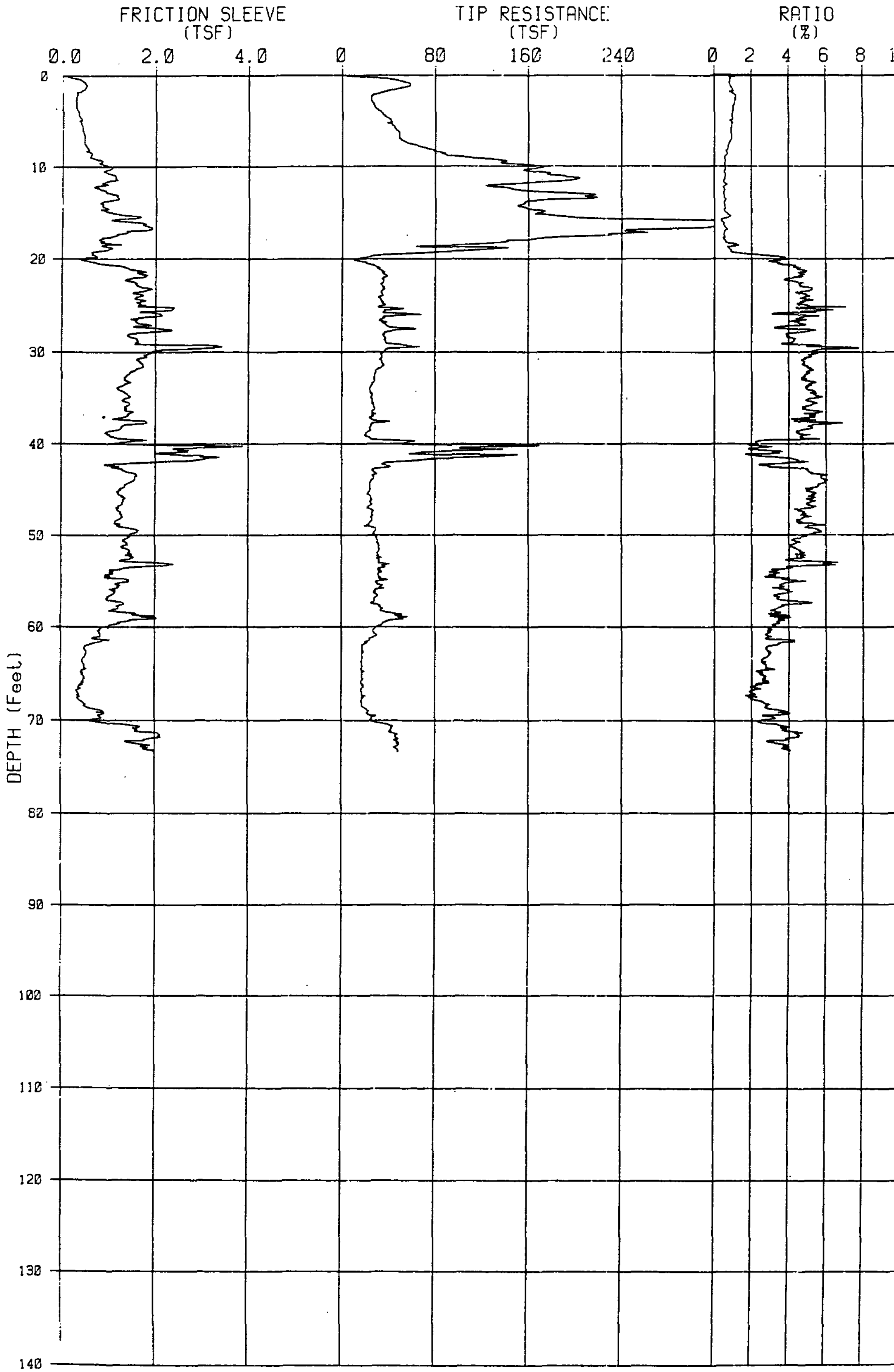
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 26 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

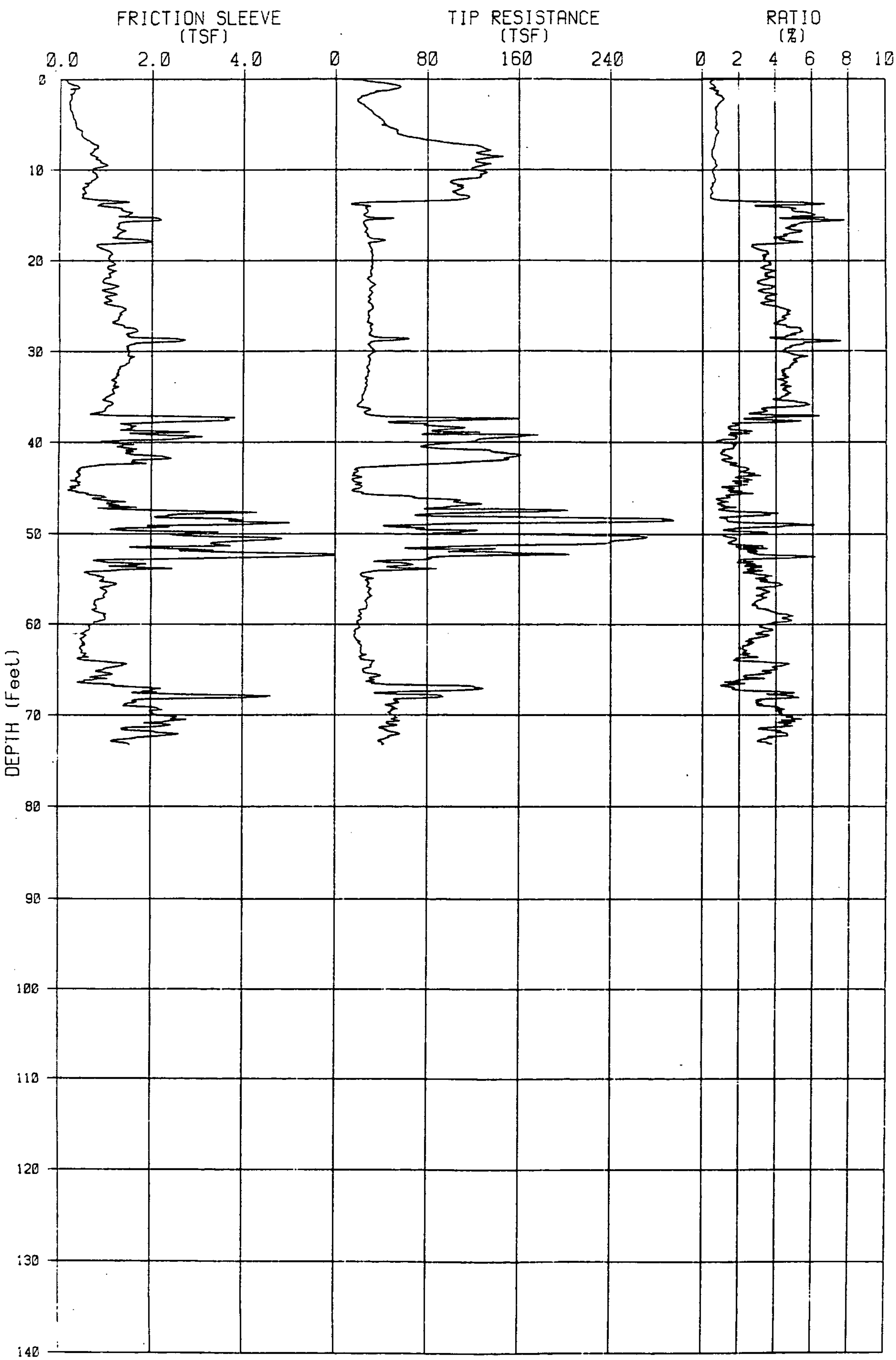
FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 27 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

FUGRO INTER, INC



JOB NUMBER : 86-1080 CPT NUMBER : 28 DATE : 07-10-1986

ELEVATION : 0.00 CONE NUMBER: F10CKE301

FUGRO INTER, INC

Appendix 10

Soil Geotechnical Test Results

REI

RESOURCE ENGINEERING

DIRECT SHEAR ANALYSIS

ROJECT : FRENCH JOB NO. 275-14

TESTED BY: [signature] DATE: 9/16/86

SPRING NO. 4

SAMPLE NO.		R 2	R 3	R3	R 8		
DEPTH		22'-24'	22'-24'	46'-48'	22'-24'		
SOIL		LT BRN-GRAY CL	Lt BRN CL W/ CALCAR-EOUS NODULES	BRN CLAY W/ SILT POCKETS	BN CLAY W/ CALCAREOUS NODULES		
START PT.		0	0	345	0		
END PT.		112	212	157	298		
DEGREES DEFLECTION		112	212	172	298		
TORQUE :							
Kg/cm²		3.808	7.208	5.848	10.132		

PROJECT: FRENCH JOB NO.: 275-14 TESTED BY: [signature] DATE: 9/16/86

ORING + SAMPLE NO.		R 3		R 3				
DEPTH		46' - 48'		22' - 24'				
SOIL		BRN CL w/ SILT POCKETS		LT BRN CL w/ SMALL CALCAR-EOUS NODULES				
CUP #		13		2				
TOTAL SAMPLE + TARE		168.26		171.12				
TOTAL SAMPLE		126.98		129.69				
WEIGHT RETAIN + TARE		44.01		50.15				
WEIGHT RETAIN		2.73		8.72				
TARE		41.28		41.43				
% PASSING # 200		97.9 %		93.3 %				

BORING + SAMPLE NO.		R 2		R 8				
DEPTH		22'-24'		22'-24'				
SOIL		LT BRN - GRAY CL		BRN CL w/ SMALL CALCAREOUS NODULES				
CUP #		19		1				
TOTAL SAMPLE + TARE		210.06		172.53				
TOTAL SAMPLE		168.75		131.16				
WEIGHT RETAIN + TARE		66.74		52.19				
WEIGHT RETAIN		25.43		10.82				
TARE		41.31		41.37				
% PASSING # 200		84.9 %		91.7 %				

ORING + SAMPLE NO.								
EPTH								
OIL								
UP #								
OTAL SAMPLE + TARE								
OTAL SAMPLE								
EIGHT RETAIN + TARE								
EIGHT RETAIN								
ARE								
PASSING # 200								

RESOURCE ENGINEERING INC.
Consulting Engineers

$\left(\dfrac{\text{WEIGHT RETAIN}}{\text{TOTAL SAMPLE}}\right)$ X 100 – 100 = % Passing # 200

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: ______ DATE: ______ TESTED BY: [signature] DATE: 9/12/86

BORING NO.: ______ SAMPLE NO.: R 2 DEPTH: 8'-10'

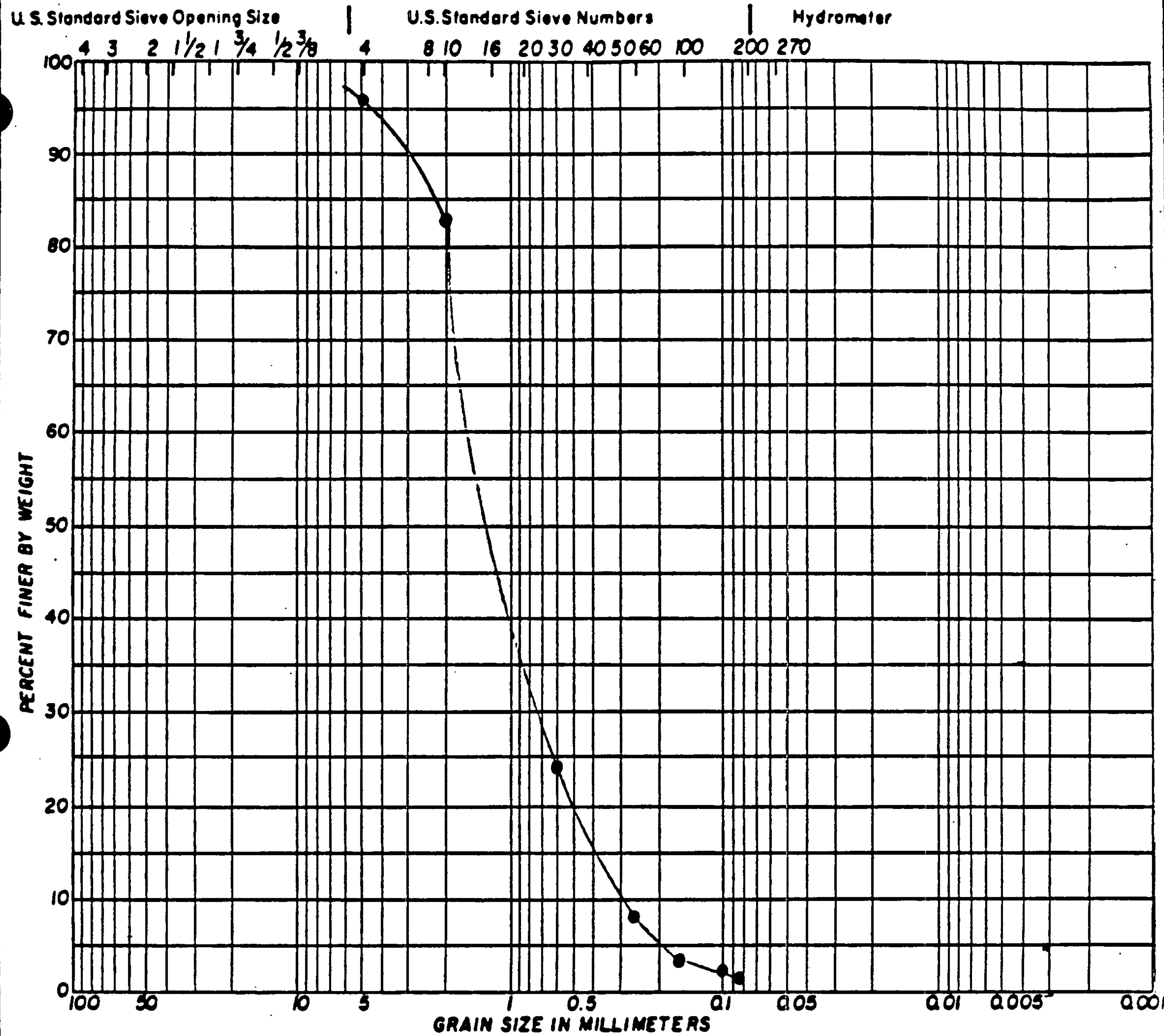
CLASSIFICATION: ______

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 101.6
WT. TARE NO. 9 41.1
DRY WT. TOTAL SAMPLE 60.5

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE ______
WT. TARE NO. ______ ______
DRY WT. WASHED SAMPLE ______
WT. WASHED- #200 ______
PERCENT WASHED- #200 ______

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	2.3	3.8	96.2		25-45	35-55
	10	10.0	16.5	83.5			
	~~20~~ 30	46.0	76.0	24.0			
	~~40~~						
	60	55.2	91.2	8.8			
	~~80~~						
	100	57.6	95.2	4.8			
	~~120~~						
	140	58.9	97.4	2.6			
	~~170~~						
	200	59.3	98.0	2.0		2-9	2-9
	PAN	60.2	99.5				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No.________ Appr:_____ Date_______

PARTICLE SIZE ANALYSIS

R 2 8'-10'

PLATE

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: ______ DATE: ______ TESTED BY: [illegible] DATE: 9/12/86

BORING NO.: ______ SAMPLE NO.: R 2 DEPTH: 10'-12'

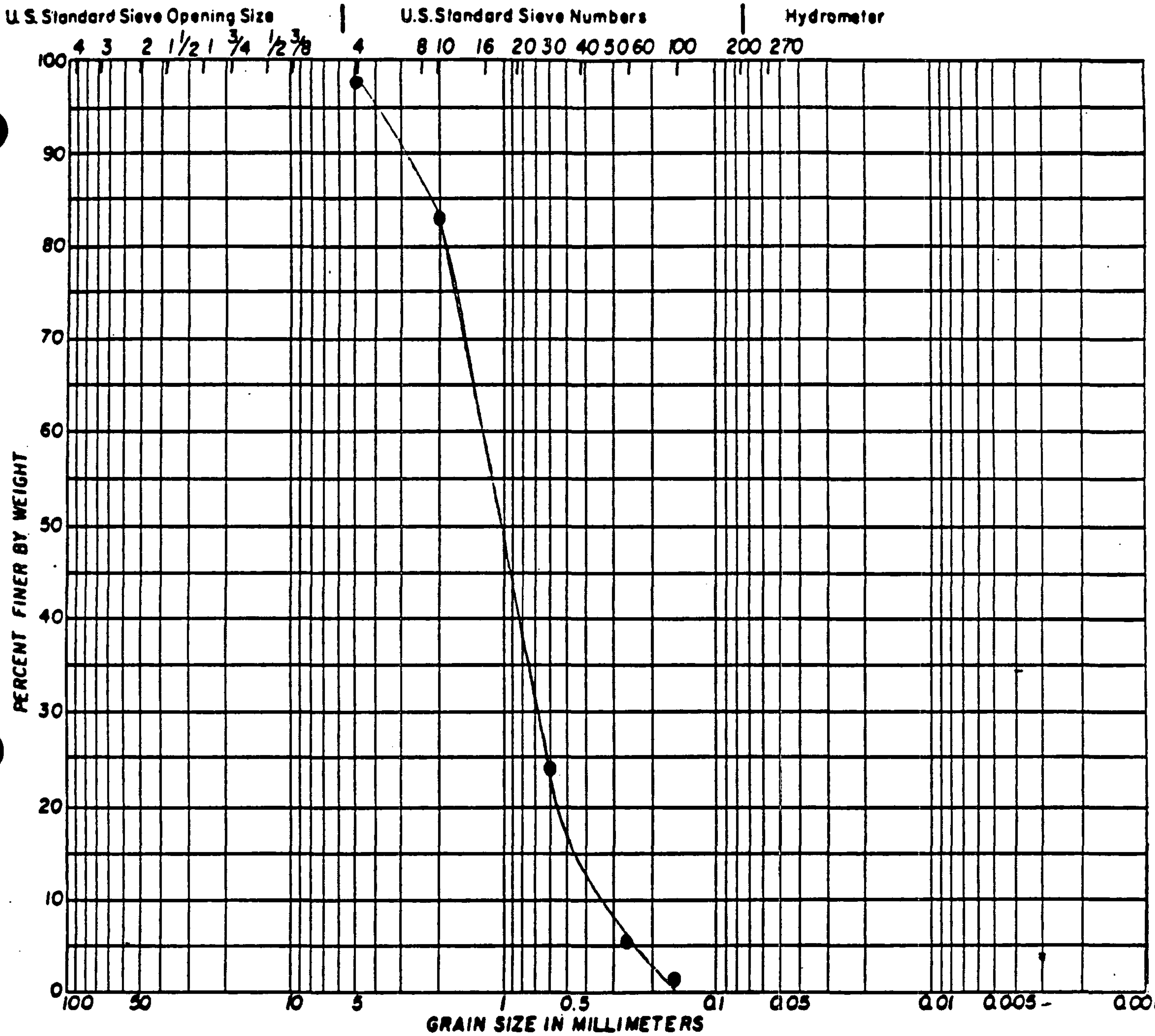
CLASSIFICATION: ______

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 120.0
WT. TARE NO. 9 41.1
DRY WT. TOTAL SAMPLE 78.9

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE ______
WT. TARE NO. ______ ______
DRY WT. WASHED SAMPLE ______
WT. WASHED- #200 ______
PERCENT WASHED- #200 ______

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	2.7	3.4	96.6		25-45	35-55
	10	13.2	16.7	83.3			
	~~20~~ 30	60.1	76.2	23.8			
	~~40~~						
	60	74.9	94.9	5.1			
	~~80~~						
	100	77.5	98.2	1.8			
	~~120~~						
	140	78.1	98.9	1.1			
	~~170~~ 200	78.3	99.2	0.8			
	~~200~~ 230	78.7	99.7	0.3		2-9	2-9
	PAN	78.8	99.9				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

PARTICLE SIZE ANALYSIS

R 2 10' - 12'

PLATE

Job No.______ Appr:______ Date______

Atterberg Limit Determinations

Data & Computation Sheet Project: FRENCH Job No.: 275-14

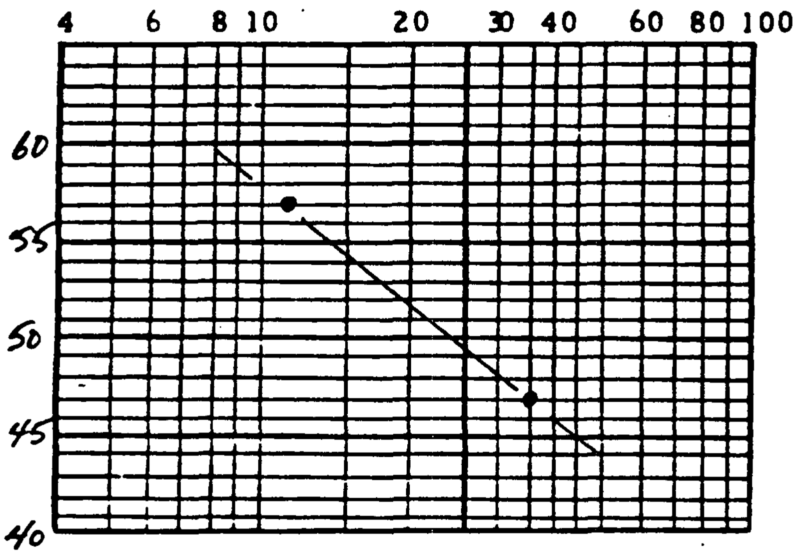
Hole No.: ________ Sample: R 2 Depth.: 22'- 24'

Date of Test: 9/12/86 Material: yu-by SC Apparatus No.: ________

Preparation: ________ Washed - #40: ________ Air-dried ____ @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2			
A	Wt. Wet Sple & Dish, g(2)	12.36	13.29			
B	Wt. Dry Sple & Dish, g(2)	8.91	9.05			
C	Weight of Dish g(2)	1.62	1.61			
D	Dry Wt. Sple = B-C g(2)	7.29	7.44			
E	Wt. Moisture = A-B g(2)	3.45	4.24			
	% Moisture = 100 E/D(1)	47.3	56.9			
	Number of Blows:	35	12			



CH

Summary:

Liquid Limit = 49.5 %

Plastic Limit = 16.8 %

Plas. Index = 32.7 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ________ %

Toughness Index = P.I./F.I. = ________ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	10.41				
B	Wt. Dry Sple & Dish, g(2)	9.15				
C	Weight of Dish g(2)	1.63				
D	Dry Wt. Sple = B-C g(2)	7.52				
E	Wt. Moisture = A-B g(2)	1.26				
	Plastic Limit = 100 E/D(1)	16.8				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: J Simpson

Computed By: [signature]

Checked By: ________

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: DATE: TESTED BY: Simpa DATE: 9/12/86

BORING NO.: SAMPLE NO.: R 2 DEPTH: 22'-24'

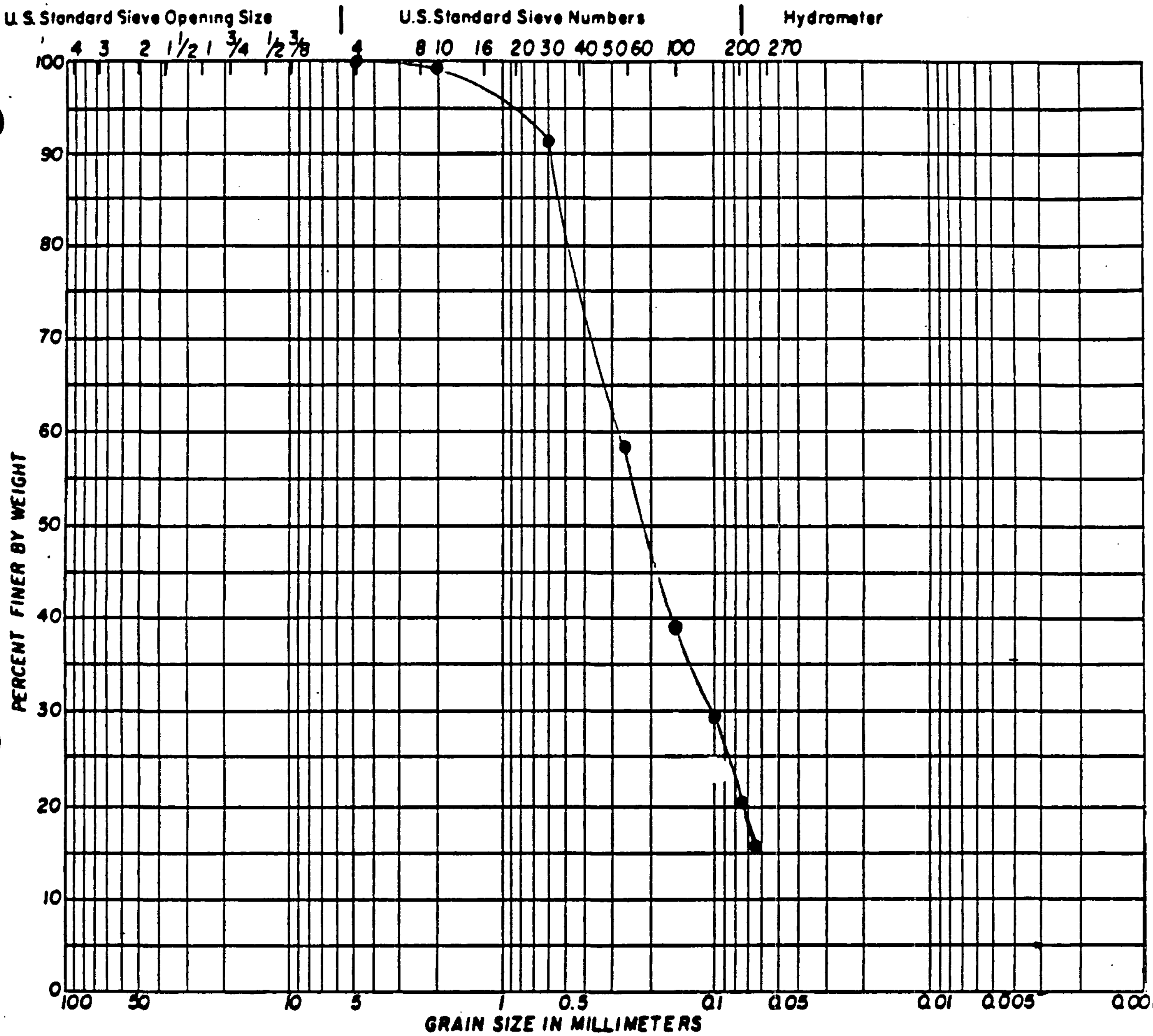
CLASSIFICATION:

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 164.4
WT. TARE NO. 1 41.3
DRY WT. TOTAL SAMPLE 123.1

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE
WT. TARE NO.
DRY WT. WASHED SAMPLE
WT. WASHED- #200
PERCENT WASHED- #200

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	0	0	100		25-45	35-55
	10	0.4	0.3	99.7			
	~~20~~ 30	10.0	8.1	91.9			
	~~40~~						
	60	51.7	41.9	58.1			
	~~80~~						
	100	75.1	61.0	39.0			
	~~120~~						
	140	86.4	70.2	29.8			
	~~170~~ 200	98.1	79.7	20.3			
	~~200~~ 230	103.4	83.9	16.1		2-9	2-9
	PAN	123.0	99.9				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No.__________ Appr:_____ Date________

PARTICLE SIZE ANALYSIS

R 2 22' - 24'

PLATE

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: ______ DATE: ______ TESTED BY: Simpson DATE: 9/15/86

BORING NO.: ______ SAMPLE NO.: R2 DEPTH: 38'-40'

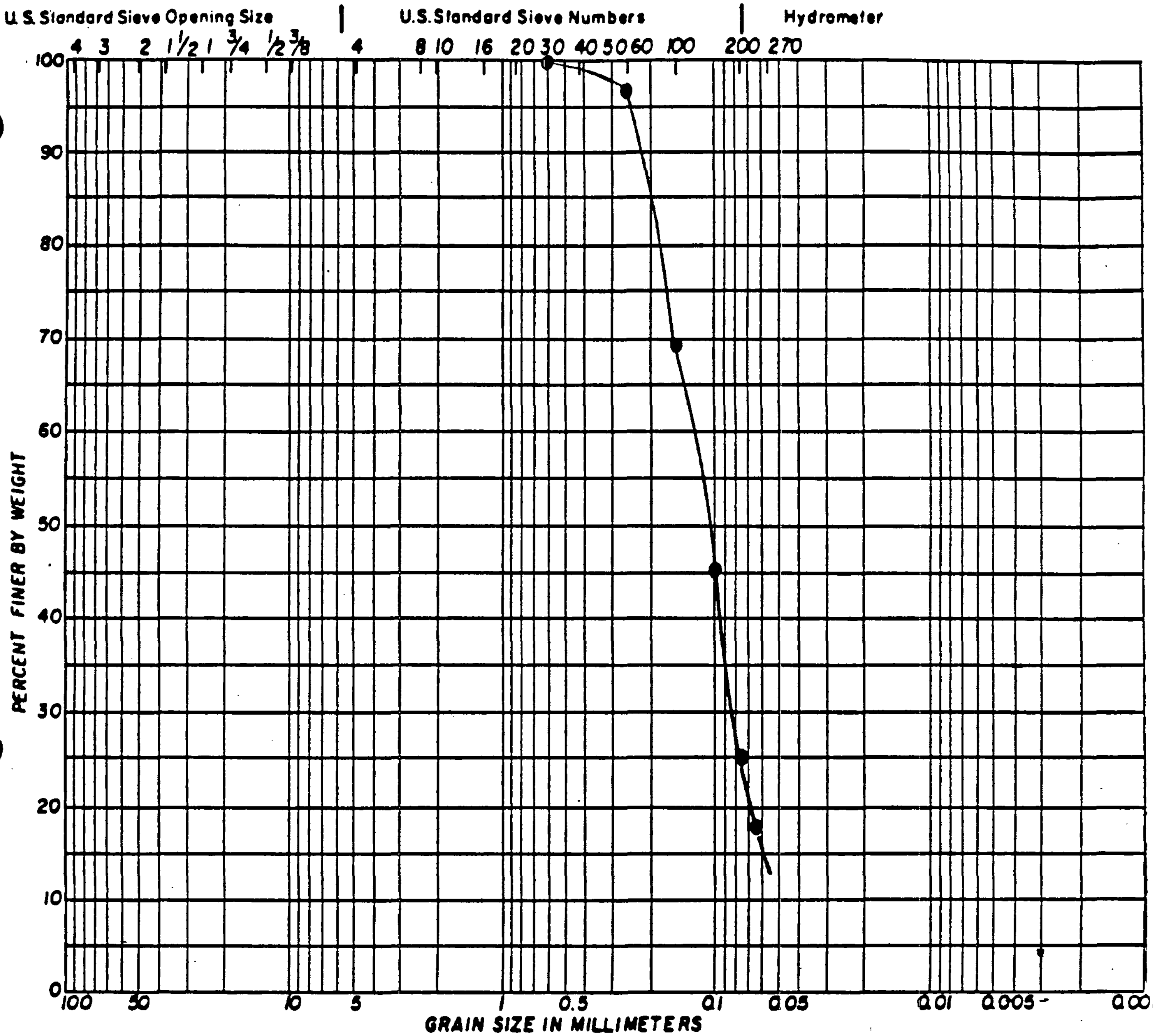
CLASSIFICATION: ______

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 160.1
WT. TARE NO. 8 41.3
DRY WT. TOTAL SAMPLE 118.8

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE ______
WT. TARE NO. ______ ______
DRY WT. WASHED SAMPLE ______
WT. WASHED- #200 ______
PERCENT WASHED- #200 ______

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	0	0	100		25-45	35-55
	10	0	0	100			
	~~20~~ 30	0	0	100			
	40						
	60	4.1	3.5	96.5			
	~~80~~						
	100	36.2	30.5	69.5			
	~~120~~						
	140	64.6	54.4	45.6			
	~~170~~ 200	89.1	75.0	25.0			
	~~200~~ 230	98.4	82.8	17.2		2-9	2-9
	PAN	118.5	99.7				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No. 275-14 Appr. [illegible] Date 9/15/86

PARTICLE SIZE ANALYSIS

R 2 38'-40'

PLATE

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: ____ DATE: ____ TESTED BY: Snipes DATE: 9/15/86

BORING NO.: ____ SAMPLE NO.: R2 DEPTH: 48'-50'

CLASSIFICATION: ____

BEFORE WASHING:

DRY WT. TOTAL SAMPLE + TARE 254.6

WT. TARE NO. #8 41.3

DRY WT. TOTAL SAMPLE 213.3

AFTER WASHING ON #200:

DRY WT. WASHED SAMPLE + TARE ____

WT. TARE NO. ____ ____

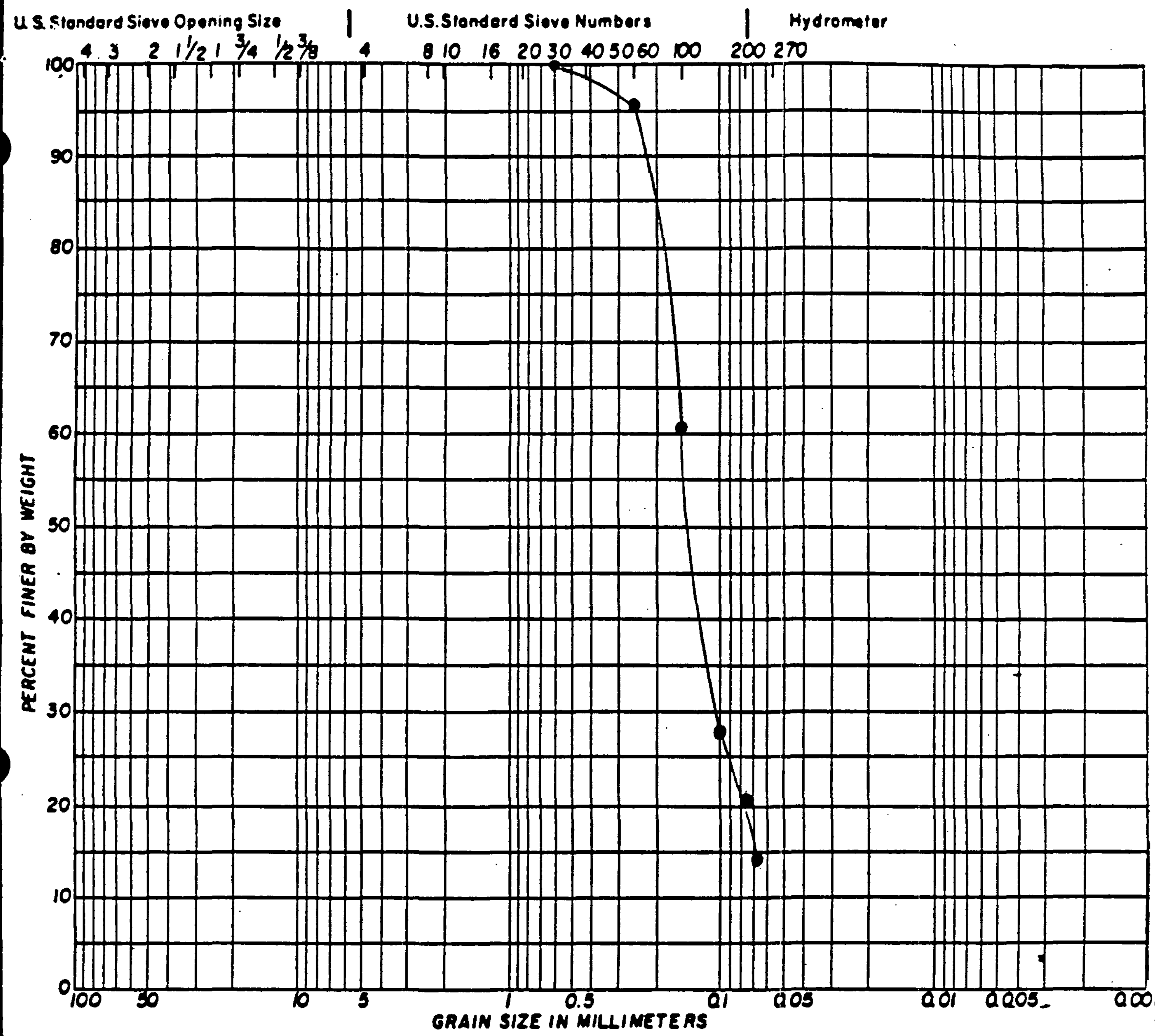
DRY WT. WASHED SAMPLE ____

WT. WASHED- #200 ____

PERCENT WASHED- #200 ____

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4					25-45	35-55
	10						
	20						
	~~40~~ 30	0	0	100			
	60	8.8	4.1	95.8			
	~~80~~						
	100	83	38.9	61.1			
	~~120~~						
	140	132.9	62.3	37.7			
	~~170~~ 200	169.7	79.5	20.5			
	~~200~~ 230	182.2	85.4	14.6		2-9	2-9
	PAN	212.9	99.8				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No. 275-14 Appr: [illegible] Date 9/15/86

PARTICLE SIZE ANALYSIS

R2 48'-50'

PLATE

Atterberg Limit Determinations

Data & Computation Sheet Project: FRENCH Job No.: 275-14

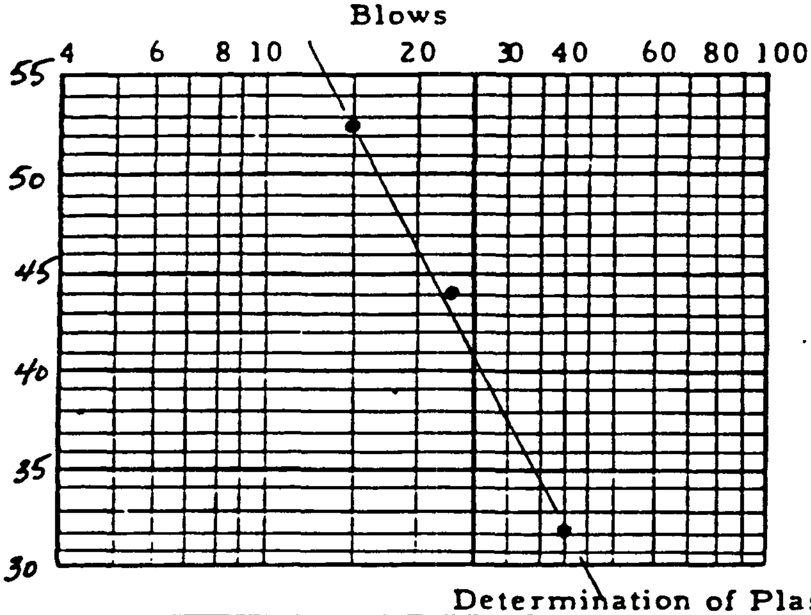
Hole No.: ______ Sample: R3 Depth.: 22'-24'

Date of Test: 9/12/86 Material: BRN CL Apparatus No.: ______

Preparation: ______ Washed - #40: ______ Air-dried ___ @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2	3		
A	Wt. Wet Sple & Dish, g(2)	16.52	18.68	19.78		
B	Wt. Dry Sple & Dish, g(2)	12.90	13.47	13.53		
C	Weight of Dish g(2)	1.62	1.63	1.62		
D	Dry Wt. Sple = B - C g(2)	11.28	11.84	11.91		
E	Wt. Moisture = A - B g(2)	3.62	5.21	6.25		
	% Moisture = 100 E/D(1)	32.1	44.0	52.5		
	Number of Blows:	40	23	15		



CL

Summary:

Liquid Limit = 41.0 %

Plastic Limit = 15.7 %

Plas. Index = 25.3 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ______ %

Toughness Index = P.I./F.I. = ______ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	9.21				
B	Wt. Dry Sple & Dish, g(2)	8.18				
C	Weight of Dish g(2)	1.63				
D	Dry Wt. Sple = B - C g(2)	6.55				
E	Wt. Moisture = A - B g(2)	1.03				
	Plastic Limit = 100 E/D(1)	15.7				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: J Simpson

Computed By: [signature]

Checked By: ______

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: ______ DATE: ______ TESTED BY: Simpson DATE: 9/12/86

BORING NO.: ______ SAMPLE NO.: R 3 DEPTH: 4'-6'

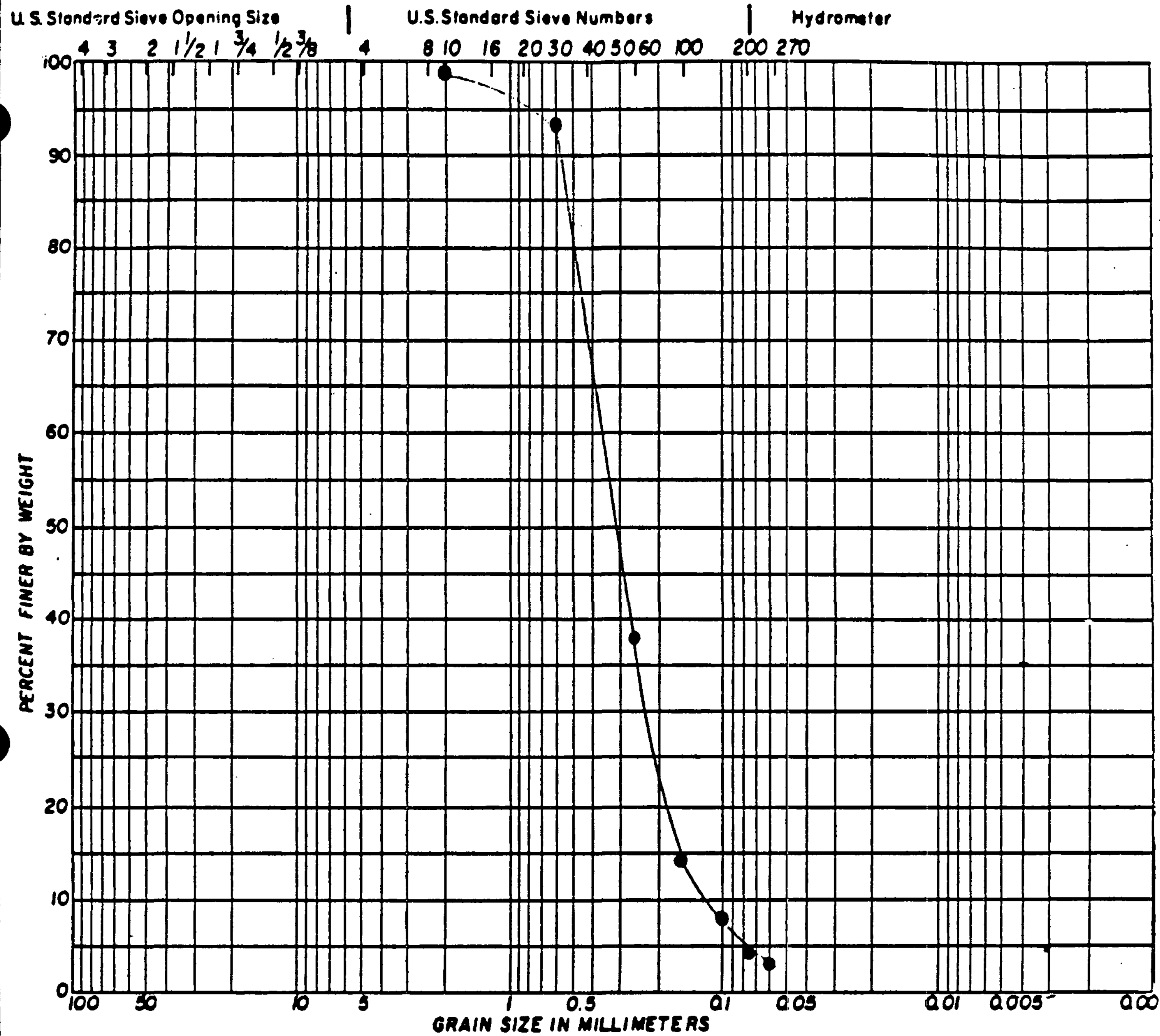
CLASSIFICATION: ______

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 364.7
WT. TARE NO. 1 41.3
DRY WT. TOTAL SAMPLE 323.4

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE ______
WT. TARE NO. ______ ______
DRY WT. WASHED SAMPLE ______
WT. WASHED- #200 ______
PERCENT WASHED- #200 ______

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	0	0	100		25-45	35-55
	10	3.3	1.0	99.0			
	~~20~~ 30	20.4	6.3	93.7			
	~~40~~						
	60	202.3	62.6	37.4			
	~~80~~						
	100	276.8	85.6	14.4			
	~~120~~						
	140	298.7	92.4	7.6			
	~~170~~ 200	309.0	95.5	4.5			
	~~200~~ 230	311.7	96.4	3.6		2-9	2-9
	PAN	322.8	99.				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No.________ Appr:_____ Date________

PARTICLE SIZE ANALYSIS

R 3   4' - 6'

PLATE

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: DATE: TESTED BY: J Simpson DATE: 9/12/86

BORING NO.: SAMPLE NO.: R 3 DEPTH: 14'-16'

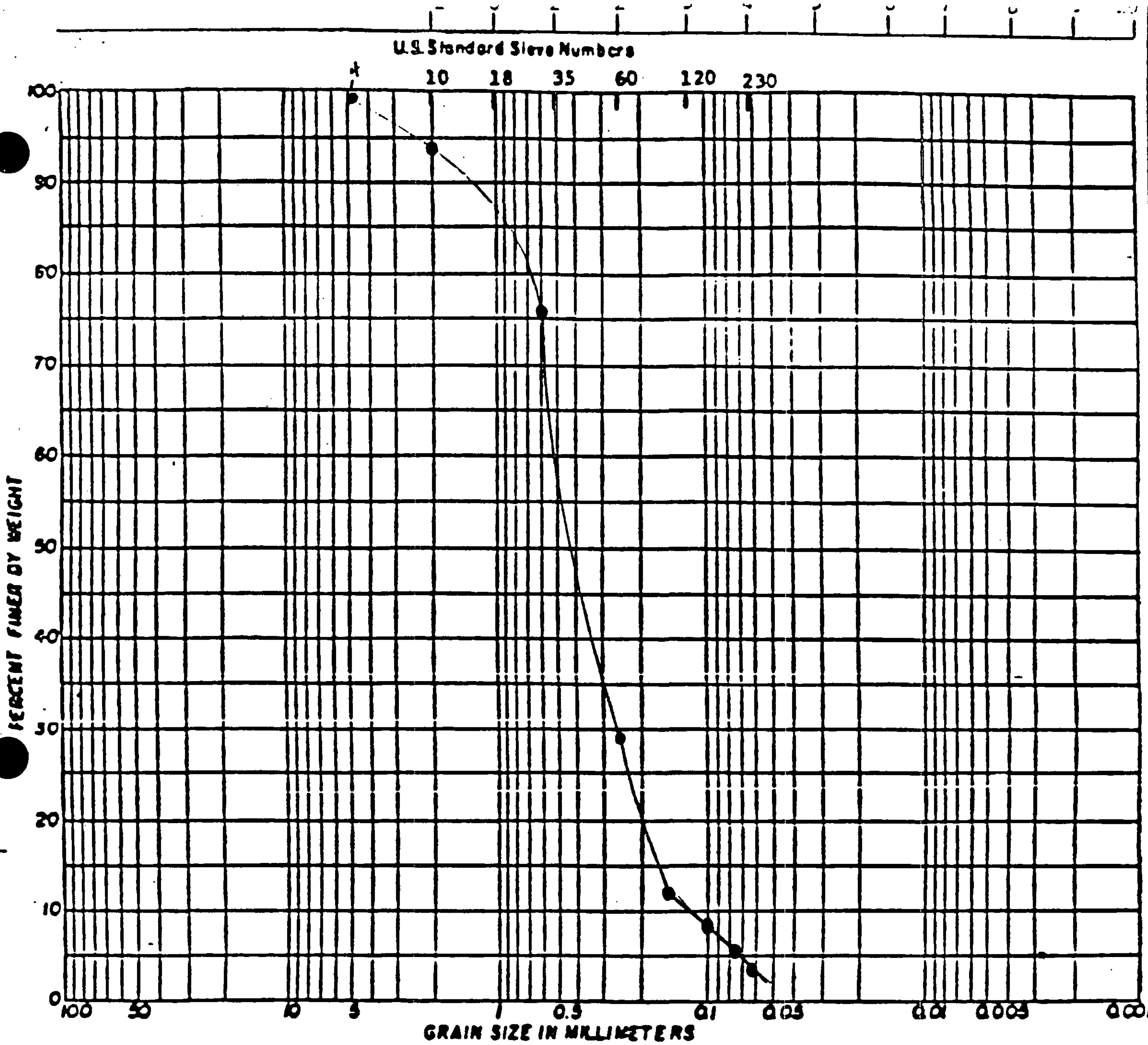
CLASSIFICATION:

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 327.8
WT. TARE NO. 9 41.1
DRY WT. TOTAL SAMPLE 286.7

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE
WT. TARE NO.
DRY WT. WASHED SAMPLE
WT. WASHED- #200
PERCENT WASHED- #200

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	5.5	1.9	98.1		25-45	35-55
	10	16.1	5.6	94.4			
	30	69.4	24.2	75.7			
	40						
	60	203.0	70.8	29.2			
	80						
	100	250.2	87.3	12.7			
	120						
	140	263.6	91.9	8.1			
	170						
	200	270.2	94.2	5.8		2-9	2-9
	230 ~~PAN~~	273.5	95.4	4.6			
	TOTAL	286.5	99.9				

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	VC	C	M	F	VF	VC	C	M	F	VF	C	M	F	VF	C	M
	GRAVEL					SAND					SILT				CLAY	

Symbol	Sample Source	Classification
	R 3 14'-16'	

RESOURCE ENGINEERING INC.
Consulting Engineers

PARTICLE SIZE ANALYSIS

PLATE

Job No. 275-14 Appr. Date 9/12/86

Atterberg Limit Determinations

Data & Computation Sheet Project: FRENCH Job No.: 275-14

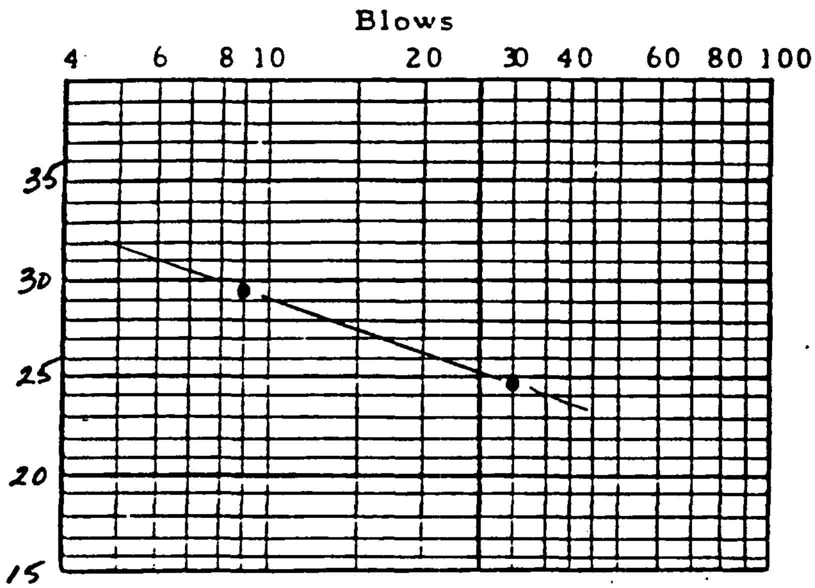
Hole No.: ______ Sample: R3 Depth.: 34'-36'

Date of Test: 9/15/86 Material: GRAY SC Apparatus No.: ______

Preparation: ______ Washed - #40: ______ Air-dried ____ @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2			
A	Wt. Wet Sple & Dish, g(2)	17.65	23.27			
B	Wt. Dry Sple & Dish, g(2)	14.00	18.99			
C	Weight of Dish g(2)	1.61	1.61			
D	Dry Wt. Sple = B - C g(2)	12.39	17.38			
E	Wt. Moisture = A - B g(2)	3.65	4.28			
	% Moisture = 100 E/D(1)	29.5	24.6			
	Number of Blows:	9	30			



Summary:

Liquid Limit = 25.2 %

Plastic Limit = 13.9 %

Plas. Index = 11.3 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ______ %

Toughness Index = P.I./F.I. = ______ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	11.0				
B	Wt. Dry Sple & Dish, g(2)	9.85				
C	Weight of Dish g(2)	1.62				
D	Dry Wt. Sple = B - C g(2)	8.23				
E	Wt. Moisture = A - B g(2)	1.15				
	Plastic Limit = 100 E/D(1)	13.9				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: ______

Computed By: ______

Checked By: ______

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: DATE: TESTED BY: Simpson DATE: 9/15/86

BORING NO.: SAMPLE NO.: R 3 DEPTH: 34' - 36'

CLASSIFICATION:

BEFORE WASHING:

DRY WT. TOTAL SAMPLE + TARE 119.8

WT. TARE NO. 8 41.3

DRY WT. TOTAL SAMPLE 78.5

AFTER WASHING ON #200:

DRY WT. WASHED SAMPLE + TARE

WT. TARE NO.

DRY WT. WASHED SAMPLE

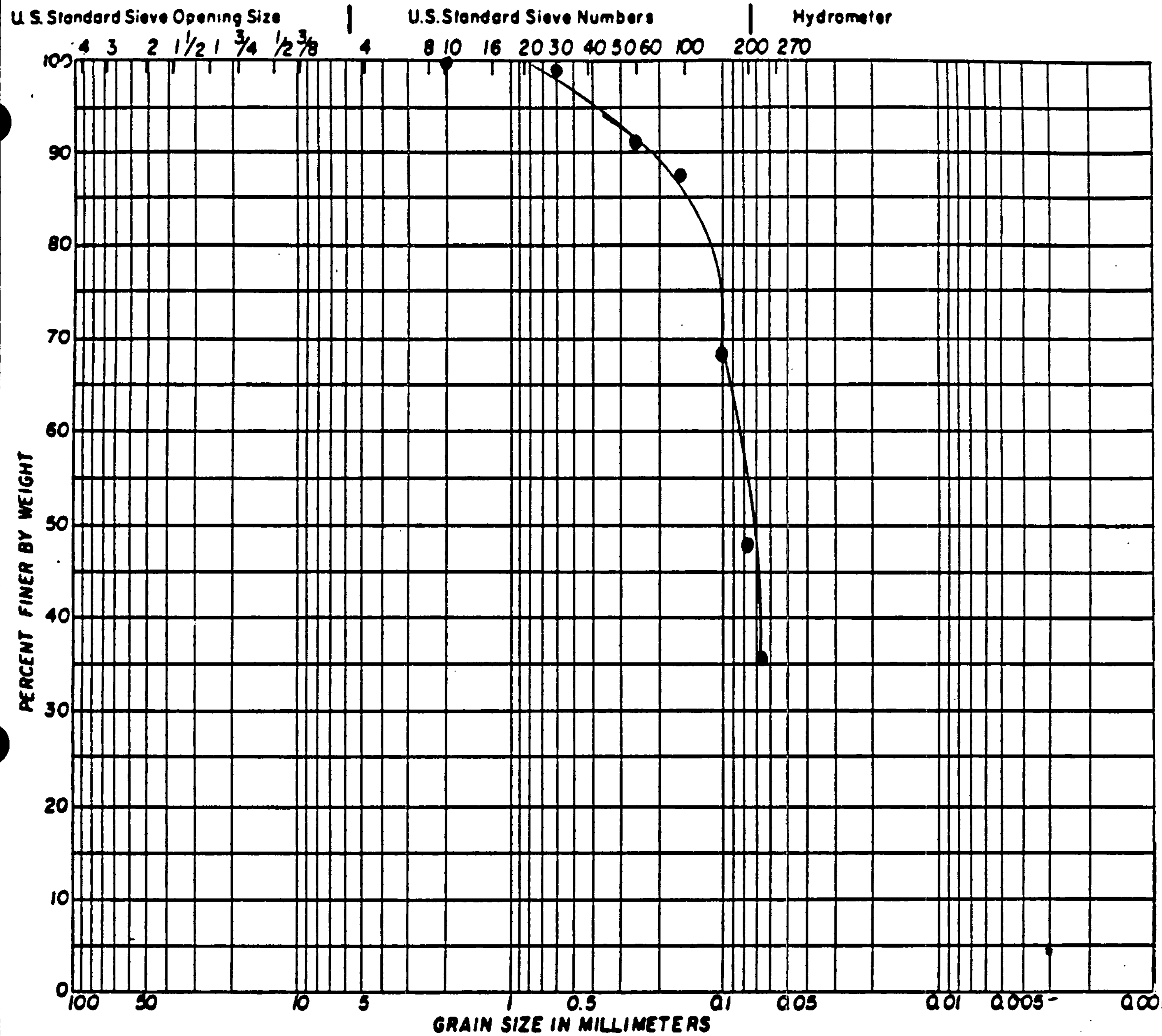
WT. WASHED- #200

PERCENT WASHED- #200

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	0	0	100		25-45	35-55
	10	0	0	100			
	~~20~~ 30	0.6	0.8	99.2			
	~~40~~						
	60	6.9	8.8	91.2			
	~~80~~						
	100	10.2	12.9	87.1			
	~~120~~						
	140	24.6	31.3	68.7			
	~~170~~ 200	41.4	52.7	47.3			
	~~200~~ 230	50.8	64.7	35.3		2-9	2-9
	PAN	78.2	99.				
	TOTAL						

RESOURCE ENGINEERING INC.

Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No. 275-14 Appr: [illegible] Date 9/15/86

PARTICLE SIZE ANALYSIS

R 3 34'-36'

PLATE

Atterberg Limit Determinations

Data & Computation Sheet   Project: FRENCH   Job No.: 275-14

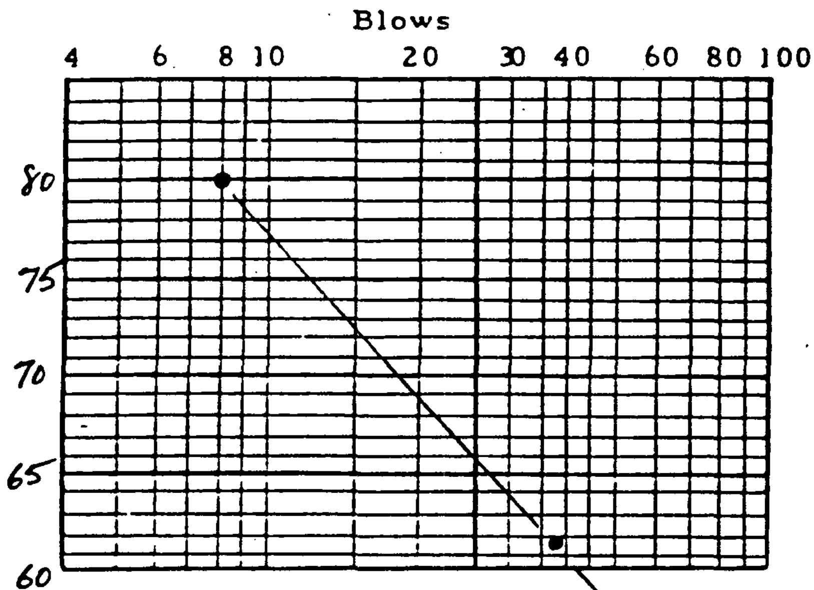
Hole No.: ____   Sample: R3   Depth.: 46' - 48'

Date of Test: 9/15/86   Material: BROWN CL   Apparatus No.: ____

Preparation: ____   Washed - #40: ____   Air-dried ____   @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2			
A	Wt. Wet Sple & Dish, g(2)	11.12	11.94			
B	Wt. Dry Sple & Dish, g(2)	7.49	7.36			
C	Weight of Dish g(2)	1.61	1.63			
D	Dry Wt. Sple = B - C g(2)	5.88	5.73			
E	Wt. Moisture = A - B g(2)	3.63	4.58			
	% Moisture = 100 E/D(1)	61.7	79.9			
	Number of Blows:	38	8			



Summary:

Liquid Limit = 66.0 %

Plastic Limit = 27.4 %

Plas. Index = 38.6 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ____ %

Toughness Index = P.I./F.I. = ____ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	7.46				
B	Wt. Dry Sple & Dish, g(2)	6.21				
C	Weight of Dish g(2)	1.64				
D	Dry Wt. Sple = B - C g(2)	4.57				
E	Wt. Moisture = A - B g(2)	1.25				
	Plastic Limit = 100 E/D(1)	27.4				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: J Simpson

Computed By: [signature]

Checked By: ____

SIEVE ANALYSIS

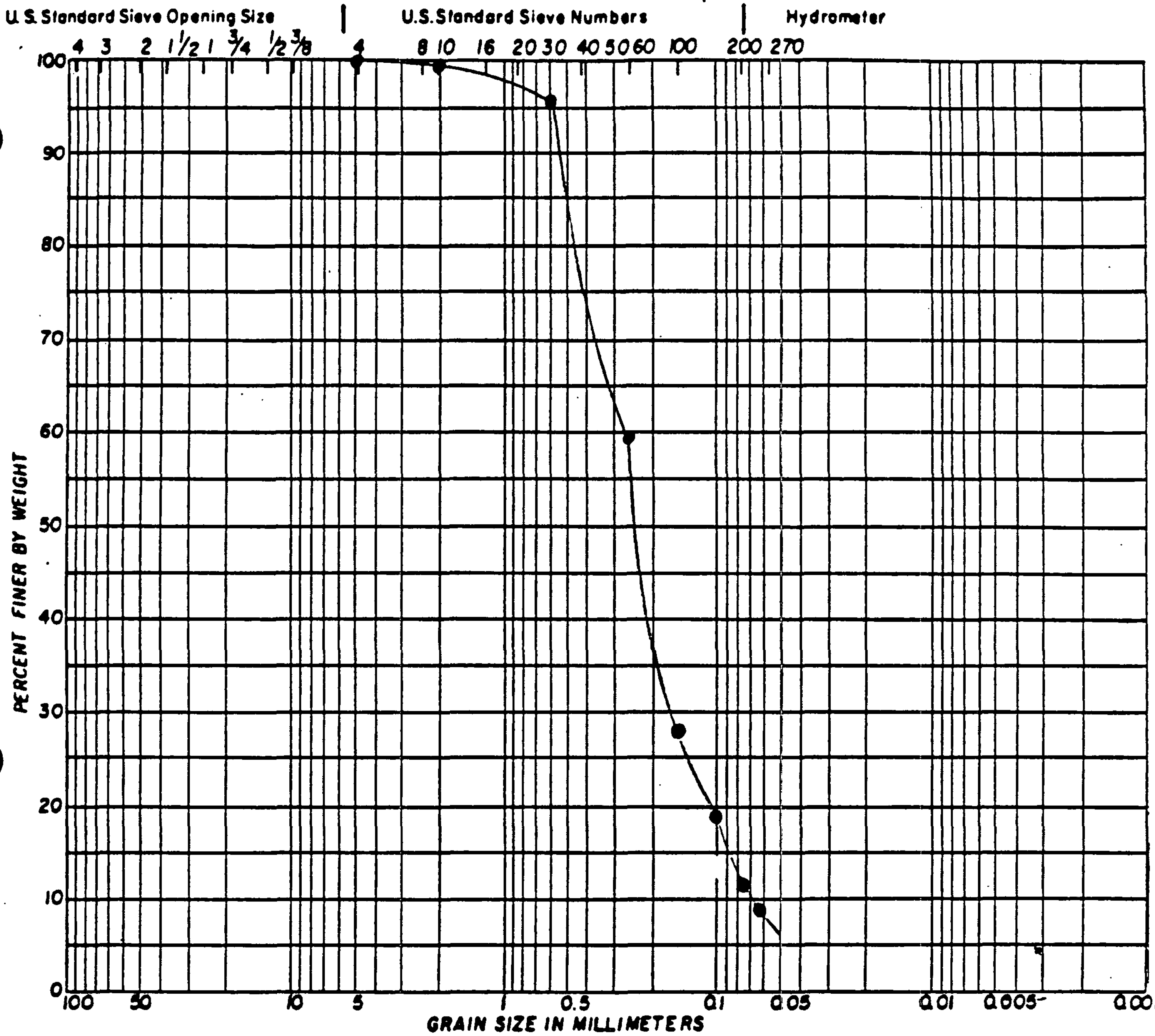
PROJECT: FRENCH
JOB NUMBER: 275-14
SAMPLED BY: ______ DATE: ______ TESTED BY: Simpson DATE: 9/12/86
BORING NO.: ______ SAMPLE NO.: R 8 DEPTH: 4'-6'
CLASSIFICATION: ______

BEFORE WASHING:
DRY WT. TOTAL SAMPLE + TARE 249.0
WT. TARE NO. 9 41.1
DRY WT. TOTAL SAMPLE 207.9

AFTER WASHING ON #200:
DRY WT. WASHED SAMPLE + TARE ______
WT. TARE NO. ______ ______
DRY WT. WASHED SAMPLE ______
WT. WASHED- #200 ______
PERCENT WASHED- #200 ______

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4	0	0	100		25-45	35-55
	10	0.1	0.05	99.9			
	~~20~~ 30	7.4	3.6	96.4			
	~~40~~						
	60	84.9	40.8	59.2			
	~~80~~						
	100	151.0	72.6	27.4			
	~~120~~						
	140	168.8	81.2	18.8			
	~~170~~ 200	182.7	87.9	12.1			
	~~200~~ 230	187.6	90.2	9.8		2-9	2-9
	PAN	207.6	99.9				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No.________ Appr:______ Date________

PARTICLE SIZE ANALYSIS

R8 4'-6'

PLATE

Atterberg Limit Determinations

Data & Computation Sheet Project: FRENCH Job No.: 275-14

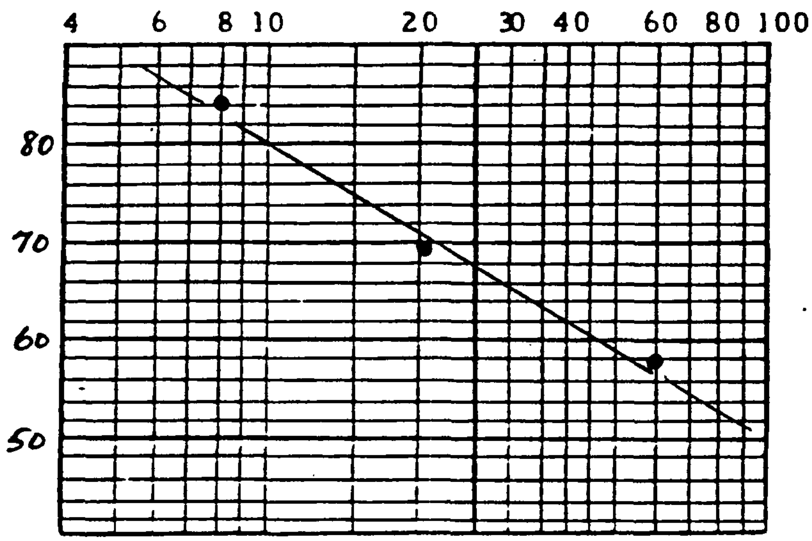
Hole No.: ______ Sample: R8 Depth.: 16'-18'

Date of Test: 9/15/86 Material: BR CL Apparatus No.: ______

Preparation: ______ Washed - #40: ______ Air-dried ______ @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2	3		
A	Wt. Wet Sple & Dish, g(2)	12.83	12.48	12.04		
B	Wt. Dry Sple & Dish, g(2)	8.73	8.02	7.25		
C	Weight of Dish g(2)	1.64	1.63	1.63		
D	Dry Wt. Sple = B - C g(2)	7.09	6.39	5.62		
E	Wt. Moisture = A - B g(2)	4.1	4.46	4.79		
	% Moisture = 100 E/D(1)	57.8	69.8	85.2		
	Number of Blows:	60	21	8		



Summary:

Liquid Limit = 68.0 %

Plastic Limit = 30.8 %

Plas. Index = 37.2 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ______ %

Toughness Index = P.I./F.I. = ______ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	6.80				
B	Wt. Dry Sple & Dish, g(2)	5.58				
C	Weight of Dish g(2)	1.63				
D	Dry Wt. Sple = B-C g(2)	3.95				
E	Wt. Moisture = A-B g(2)	1.22				
	Plastic Limit = 100 E/D(1)	30.8				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: [signature]

Computed By: [signature]

Checked By: ______

Atterberg Limit Determinations

Data & Computation Sheet   Project: FRENCH   Job No.: 275-14

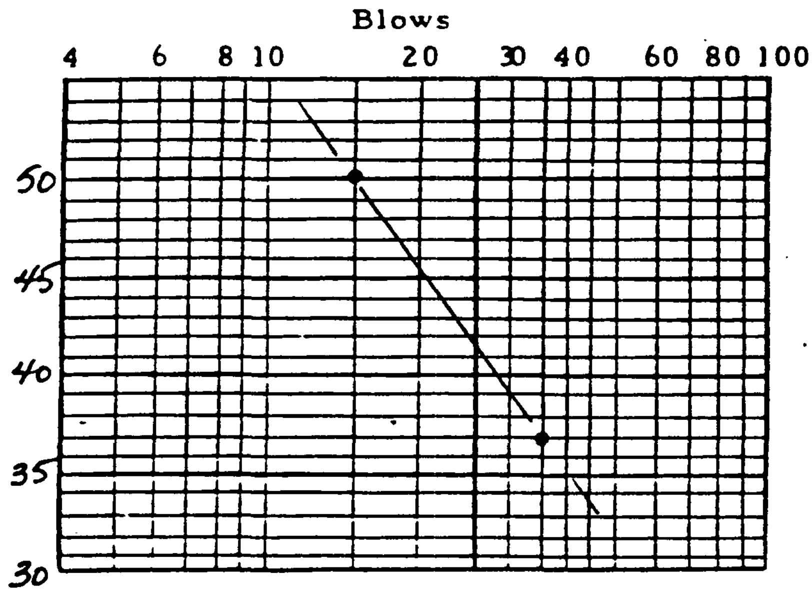
Hole No.: ______   Sample: R8   Depth.: 22'-24'

Date of Test: 9/12/86   Material: BN CL   Apparatus No.: ______

Preparation: ______ Washed - #40: ______ Air-dried ____ @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2			
A	Wt. Wet Sple & Dish, g(2)	17.73	18.31			
B	Wt. Dry Sple & Dish, g(2)	12.36	13.81			
C	Weight of Dish g(2)	1.63	1.62			
D	Dry Wt. Sple = B - C g(2)	10.73	12.19			
E	Wt. Moisture = A - B g(2)	5.37	4.5			
	% Moisture = 100 E/D(1)	50.04	36.9			
	Number of Blows:	15	35			



CL

Summary:

Liquid Limit = 41.5 %

Plastic Limit = 15.2 %

Plas. Index = 26.3 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ______ %

Toughness Index = P.I./F.I. = ______ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	9.42				
B	Wt. Dry Sple & Dish, g(2)	8.40				
C	Weight of Dish g(2)	1.64				
D	Dry Wt. Sple = B - C g(2)	6.72				
E	Wt. Moisture = A - B g(2)	1.02				
	Plastic Limit = 100 E/D(1)	15.2				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: J Simpson

Computed By: [signature]

Checked By: ______

Atterberg Limit Determinations

Data & Computation Sheet   Project: FRENCH   Job No.: 275-14

Hole No.: R 8   Sample: ______   Depth.: 40'-42'

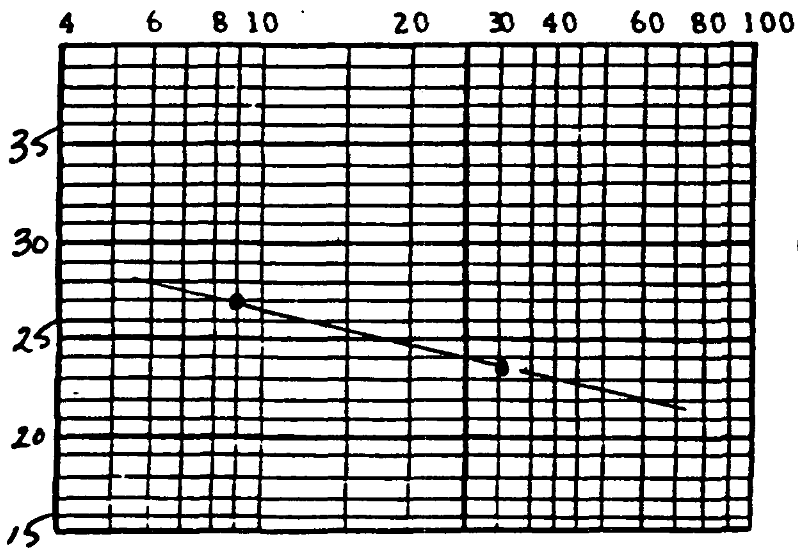
Date of Test: 9/12/86   Material: GRAY-BRH SM   Apparatus No.: ______

Preparation: ______   Washed - #40: ______   Air-dried ____   @Nat. M.C. X

Determination of Liquid Limit

	Dish No.:	1	2			
A	Wt. Wet Sple & Dish, g(2)	14.53	20.82			
B	Wt. Dry Sple & Dish, g(2)	11.87	17.16			
C	Weight of Dish g(2)	1.60	1.60			
D	Dry Wt. Sple = B-C g(2)	10.27	15.56			
E	Wt. Moisture = A-B g(2)	2.66	3.66			
	% Moisture = 100 E/D(1)	25.9	23.5			
	Number of Blows:	9	31			

Blows



CL

Summary:

Liquid Limit = 24.0 %

Plastic Limit = 15.7 %

Plas. Index = 8.3 %

Flow Index = Numerical difference in moisture content for 1 cycle on log plot = ______ %

Toughness Index = P.I./F.I. = ______ %

Determination of Plastic Limit

	Dish No.					
A	Wt. Wet Sple & Dish, g(2)	7.04				
B	Wt. Dry Sple & Dish, g(2)	6.30				
C	Weight of Dish g(2)	1.61				
D	Dry Wt. Sple = B-C g(2)	4.69				
E	Wt. Moisture = A-B g(2)	.74				
	Plastic Limit = 100 E/D(1)	15.7				

RESOURCE ENGINEERING INC.
Consulting Engineers

Tested By: J Simpson

Computed By: [signature]

Checked By: ______

SIEVE ANALYSIS

PROJECT: FRENCH JOB NUMBER: 275-14

SAMPLED BY: DATE: TESTED BY: Simpson DATE: 9/12/86

BORING NO.: SAMPLE NO.: R 8 DEPTH: 40'-42'

CLASSIFICATION:

BEFORE WASHING:

DRY WT. TOTAL SAMPLE + TARE 275.1

WT. TARE NO. 9 41.1

DRY WT. TOTAL SAMPLE 234.0

AFTER WASHING ON #200:

DRY WT. WASHED SAMPLE + TARE

WT. TARE NO.

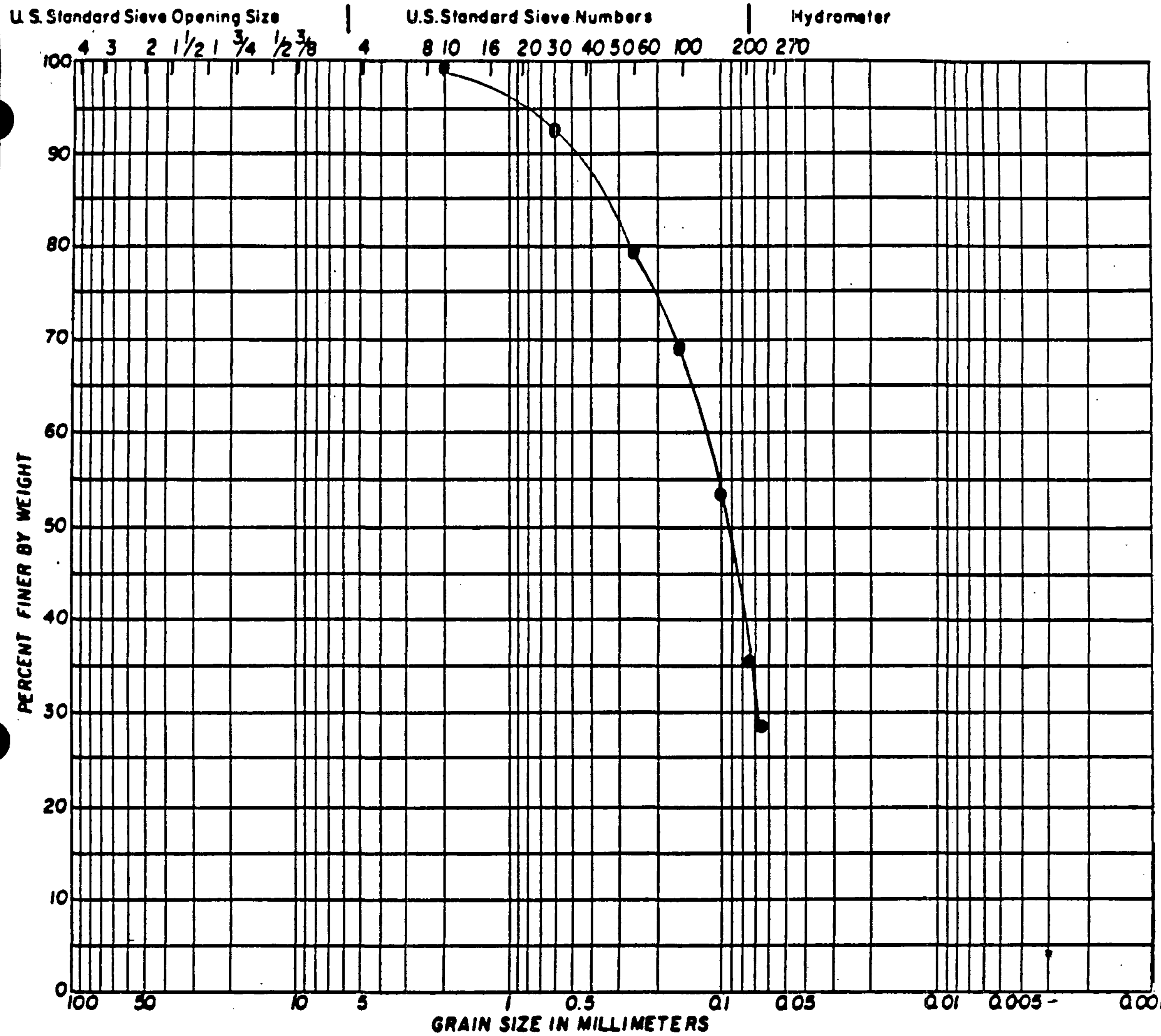
DRY WT. WASHED SAMPLE

WT. WASHED- #200

PERCENT WASHED- #200

	SIEVE SIZE	WEIGHT RETAINED CUMULATIVE	PERCENT RETAINED CUMULATIVE	CUMULATIVE PERCENT FINER		CLASS 2 1½" max	AGGREGATE BASE
	2"					100	
	1½"					90-100	
	1"						100
	3/4"					50-85	90-100
	½"						
	¼"						
	4					25-45	35-55
	10	0.8	0.3	99.7			
	~~20~~ 30	10.7	4.6	93.4			
	~~40~~						
	60	48.2	20.6	79.4			
	~~80~~						
	100	72.0	30.8	69.2			
	~~120~~						
	140	109.0	46.6	53.4			
	~~170~~ 200	152.0	64.9	35.1			
	~~200~~ 230	167.8	71.7	28.3		2-9	2-9
	PAN	233.2	99.6				
	TOTAL						

RESOURCE ENGINEERING INC.
Consulting Engineers



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification

RESOURCE ENGINEERING INC.
Consulting Engineers

Job No.______ Appr:______ Date______

PARTICLE SIZE ANALYSIS

R 8 40' - 42'

PLATE

Job No.

BORING NO: SAMPLE NO:

DEPTH, FT: 78-79

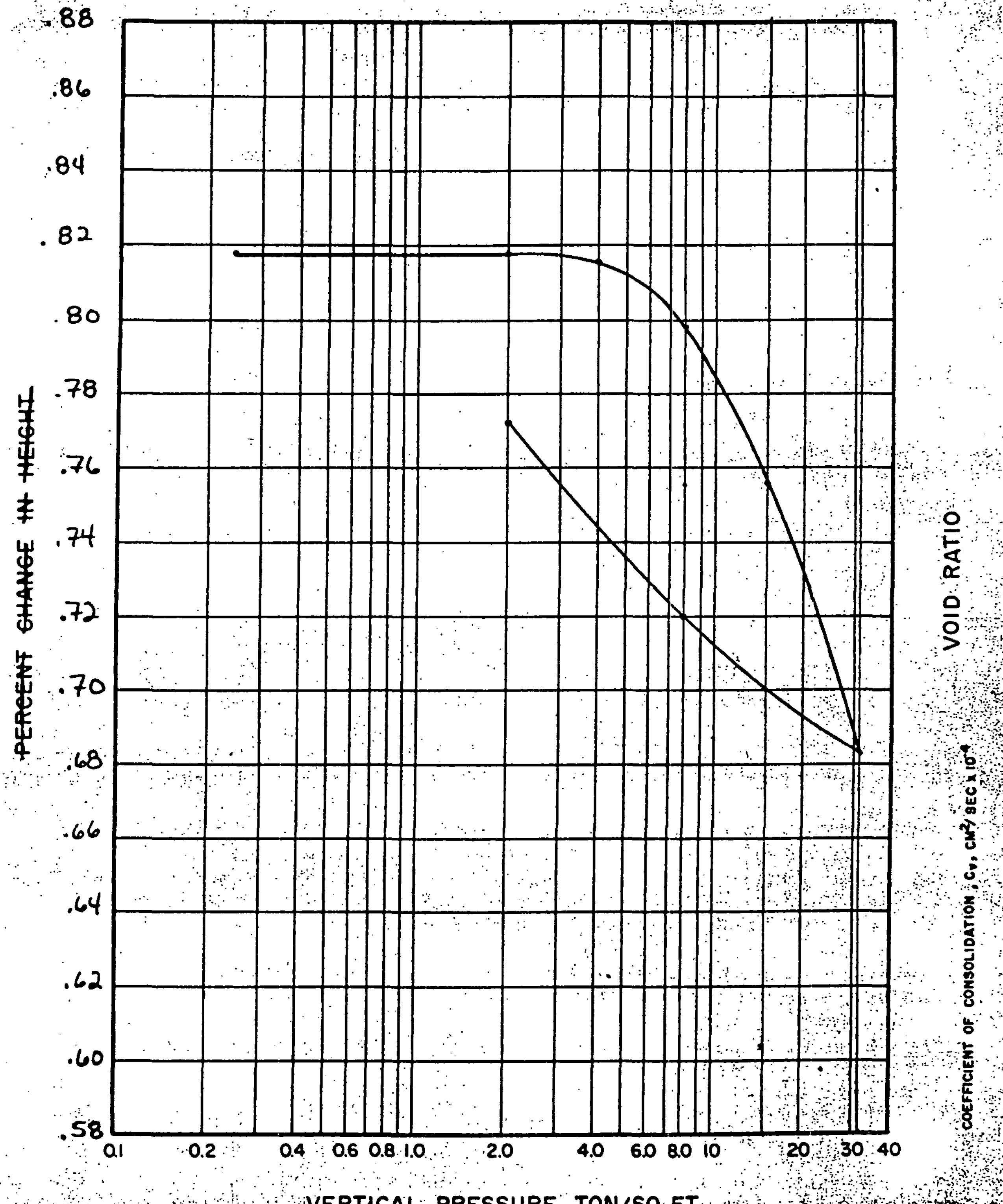
DESCRIPTION:

UNIT DRY WEIGHT: 96.1 PCF

WATER CONTENT: 28.4 %

LIQUID LIMIT:

PLASTIC LIMIT:



CONSOLIDATION TEST RESULTS

FUGRO GULF, INC.
Consulting Engineers and Geologists

PLATE

FORM L-126

CONSOLIDATION TEST

Date: ____________ Project: REI P10-4 ____________ Job No. ____________

Boring No. ____________ Sample No. ____________ Depth: 78-80 ____________ Ring No. 1

Description: Very stiff red-light gray clay w/ calcareous NODULES, SLICKENSIDED

Liquid Limit ____________

Plastic Limit ____________

Test Specimen	Initial	Final
Wet wt sple + ring	133.81	132.94
Dry wt sple + ring	117.09	117.09
Wt of ring	59.38	59.38
Dry wt of sple		
Wt of water		
Water content, %	29.0	27.5

Trimmings, Can No. 473	
Wet wt + tare	51.53
Dry wt - tare	43.56
Tare wt	15.49
Dry wt	
Wt of water	
Water content, %	28.4

A. Specific Gravity 2.75 B. Volume of Sple 37.468 c.c. C. Initial Ht of Sple 0.750 in.

D. Final Ht of Sple ______ in. E. Unit Wet Wt 124.0 lb/ft^3 F. Unit Dry Wt 96.1 lb/ft^3

G. Ht of Solids = $\dfrac{\text{Final Dry Wt Sple}}{A} \times \dfrac{C}{B}$ = [illegible] in. $\dfrac{1}{G}$ = ____________

H. Initial Void Ratio: = $\dfrac{C - G}{G}$ = 0.8179

d = 1.97

Percent Saturation:

Before Test = $\dfrac{\text{Initial Wt Water}}{B - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ______ %

After Test = $\dfrac{\text{Final Wt Water}}{B \times \dfrac{D}{C} - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ______ %

Consolidometer No:

*P = $70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N = t_{50} min.	P* c_v in.^{2}/day
.0000	—	.2520	—	—					
.0002	.25		—	—					
.0005	.5		—	—					
.0014	1		—	—					
.0030	2	.2503	.0017	—					
.0049	4	.2464	.0056	.0007			.816	3.75	10.62
.0070	8	.2368	.0152	.0082			.798	6.0	6.50
.0091	16	.2175	.0345	.0254			.756	14.0	2.66
.0115	32	.1850	.0670	.0555			.683	20.0	1.71
.0090	8	.2026	.0494	.0404			.720		
.0069	2	.2263	.0257	.0188			.772		

Tested By: [illegible]
Computed By: [illegible]
Checked By: [illegible]

CONSOLIDATION TEST
DATA SHEET

Job No. P10-4 Boring No. ______ Depth 78-79 Consol. No. 1

Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.	Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.
JZN	15 Aug	1145	0	.2520	.25 KgCM²	JZN	16 Aug	0900	0	.2499	4 KgCM²
			.1	.2516					.1	.2486	
			.25	.2515					.25	.2484	
			.5	.2514					.5	.2482	
	add H_2O →		1	.2513½					1	.2480	
			2	.2520	SWELL				2	.2478	
									4	.2476	
									8	.2473	
									15	.2470½	
JZN		1148	0	.2520	.5 KgCM²				30	.2468	
			.1	.2519					60	.2466	
			.25	.2519					120	.2463½	
			.5	.2519					240	—	
			1	.2520				1700	480	.2461½	
			2	.2521	SWELL				1380	.2459	
						JZN	17 Aug	0800	0	.2459	8 KgCM²
									.1	.2435	
JZN	15 Aug 86	1150	0	.2521	1.0 KgCM²				.25	.2431	
			.1	.2518					.5	.2428	
			.25	.2517					1	.2423	
			.5	.2516½					2	.2418	
			1	.2516					4	.2410	
			2	.2516					8	.2401½	
			4	.2516					15	.2392	
			8	.2517½					30	.2381½	
			15	.2521	SWELL				60	.2373	
									120	.2368	
									240	.2364	
									480	.2361	
JZN	15 Aug 86	1205	0	.2521	2.0 KgCM²		18 Aug	0835		.2357	
			.1	.2509							
			.25	.2507½							
			.5	.2506½		B.T.	19 Aug	0940	0	.2357	16 KgCm²
			1	.2505½					.1	.2325	
			2	.2504½					.25	.2319	
			4	.2503½					.5	.2314	
			8	.2503					1	.2307	
			15	.2502½					2	.2297½	
			30	.2502					4	.2285	
			60	.2501½					8	.2267	
		1405	120	.2501					15	.2246	
		1605	240	.2500					35	.2215	
	16 Aug	0800		.2499					60	.2196	
								1140	120	.2178	
								1340	240	.2166	
								1640	420	.2161	
								0810		.2149	

L-126

CONSOLIDATION TEST

Date: ________ Project: ________ Job No. ________

Boring No. ________ Sample No. ________ Depth: ________ Ring No. ________

Description: ________ Liquid Limit ________

________ Plastic Limit ________

Test Specimen	Initial	Final
Wet wt sple + ring		
Dry wt sple + ring		
Wt of ring		
Dry wt of sple		
Wt of water		
Water content, %		

Trimmings, Can No.	
Wet wt + tare	
Dry wt - tare	
Tare wt	
Dry wt	
Wt of water	
Water content, %	

A. Specific Gravity ________ B. Volume of Sple ________ c.c. C. Initial Ht of Sple ________ in.

D. Final Ht of Sple ________ in. E. Unit Wet Wt ________ lb/ft^3 F. Unit Dry Wt ________ lb/ft^3

G. Ht of Solids = $\frac{\text{Final Dry Wt Sple}}{A} \times \frac{C}{B}$ = ________ in. $\frac{1}{G}$ = ________

H. Initial Void Ratio: = $\frac{C - G}{G}$ = ________

Percent Saturation:

Before Test = $\dfrac{\text{Initial Wt Water}}{B - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ________ %

After Test = $\dfrac{\text{Final Wt Water}}{B \times \dfrac{D}{C} - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ________ %

Consolidometer No: $^*P = 70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N t_{50} min.	P* c_v $in.^2/day$

Tested By: ________
Computed By: ________
Checked By: ________

CONSOLIDATION TEST
DATA SHEET

Job No. ____________ Boring No. ____________ Depth ____________ Consol. No. ____________

Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.	Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.
B.T.	20 Aug	0815	0	.2149	32 Kg/cm²						
			.1	.2117							
			.25	.2110							
			.50	.2104							
			1	.2095							
			2	.2082							
			4	.2064							
			8	.2039							
			15	.2009							
			30	.1968							
			60	.1918							
		1030	~~120~~135	.1875							
			240	.1855							
		420	485	1840							
		0820		.1826							
	Rebound		0								
	21 Aug	0835	0	.1826	8 Kg/cm²						
	22 Aug	1130		.2026							
	22 Aug	1130	0	.2026	2 Kg/cm²						
				.2263							

Job No. ______ FORM

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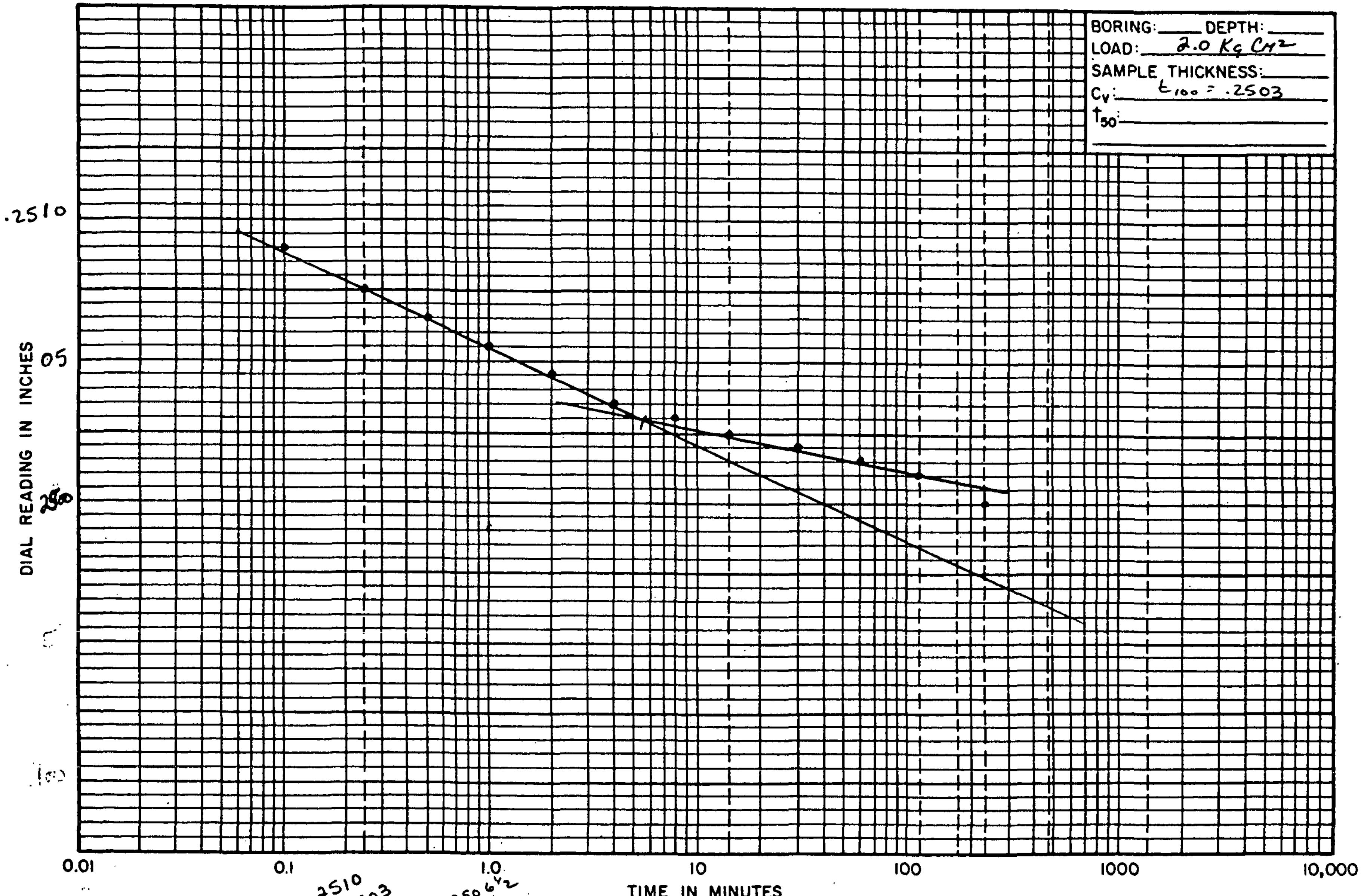

Do = 2510
t100 = .2503
D50 = .2506½

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM

FUGRO GULF, INC.
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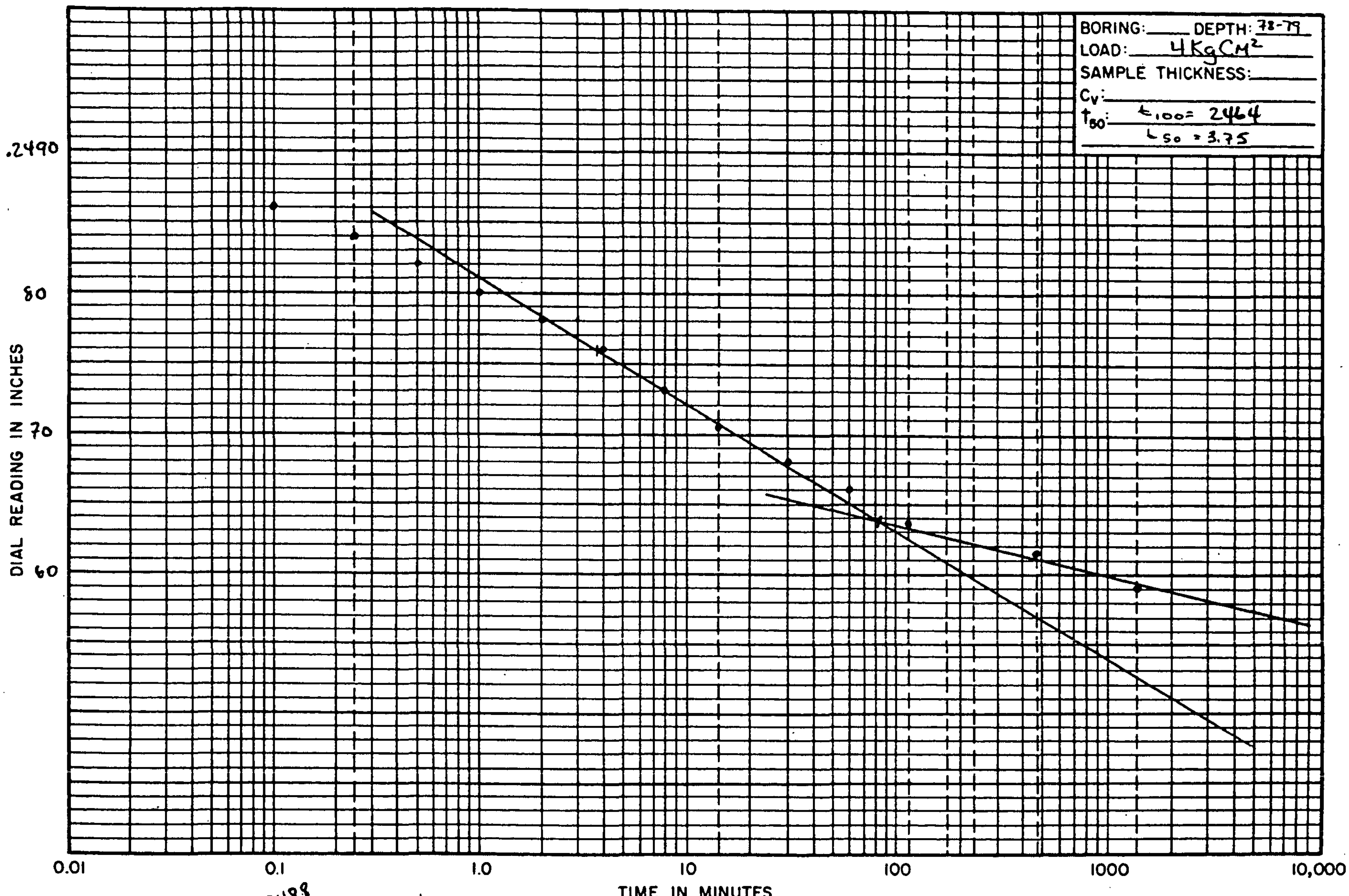

Do = 2488
t100 = 2464
D50 = 2476

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM 27

FUGRO GULF, INC.
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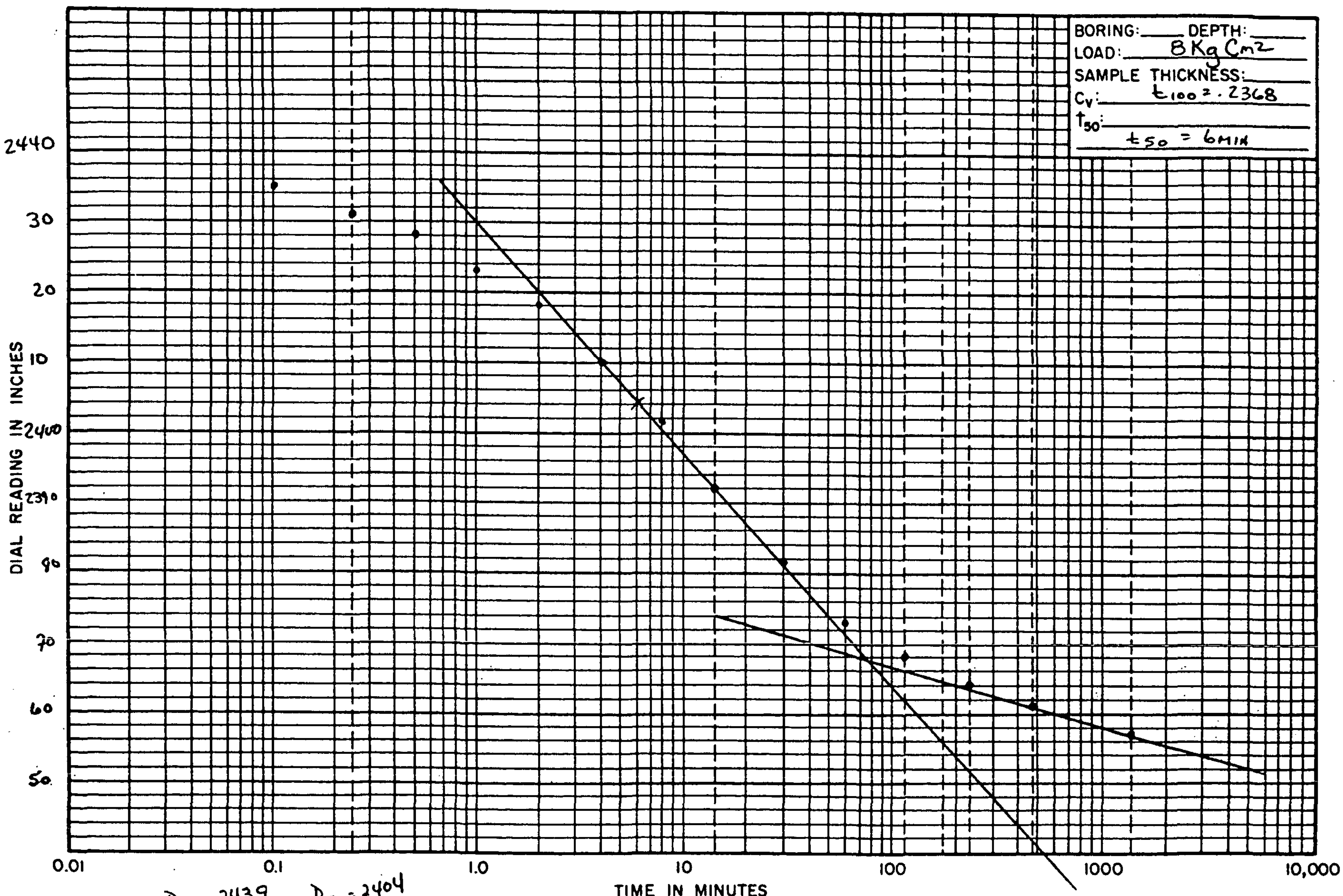

$D_0 = 2439$ $D_{50} = 2404$
D_{100} 2368

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM [illegible]

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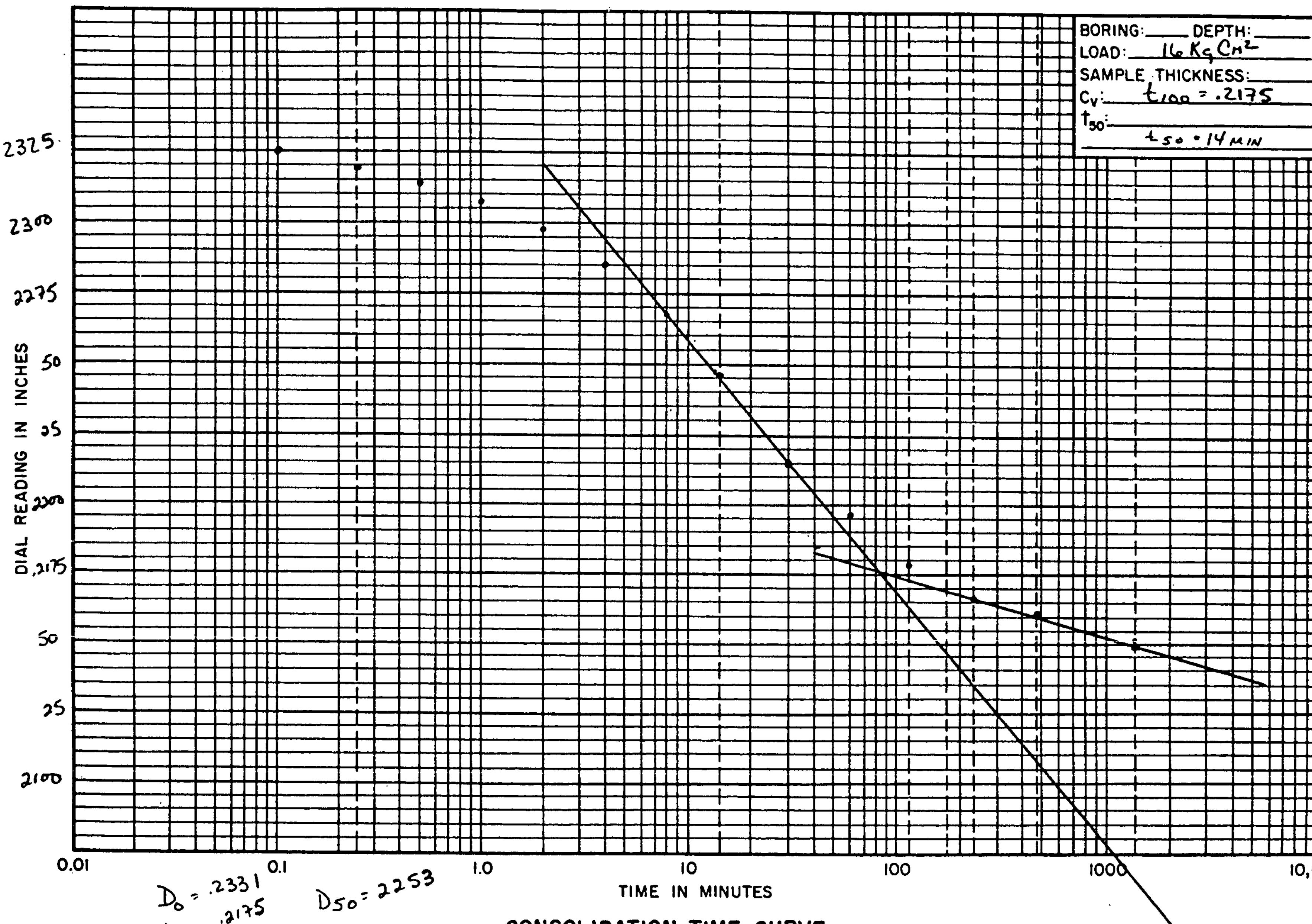

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM ...27

FUGRO GULF, INC.
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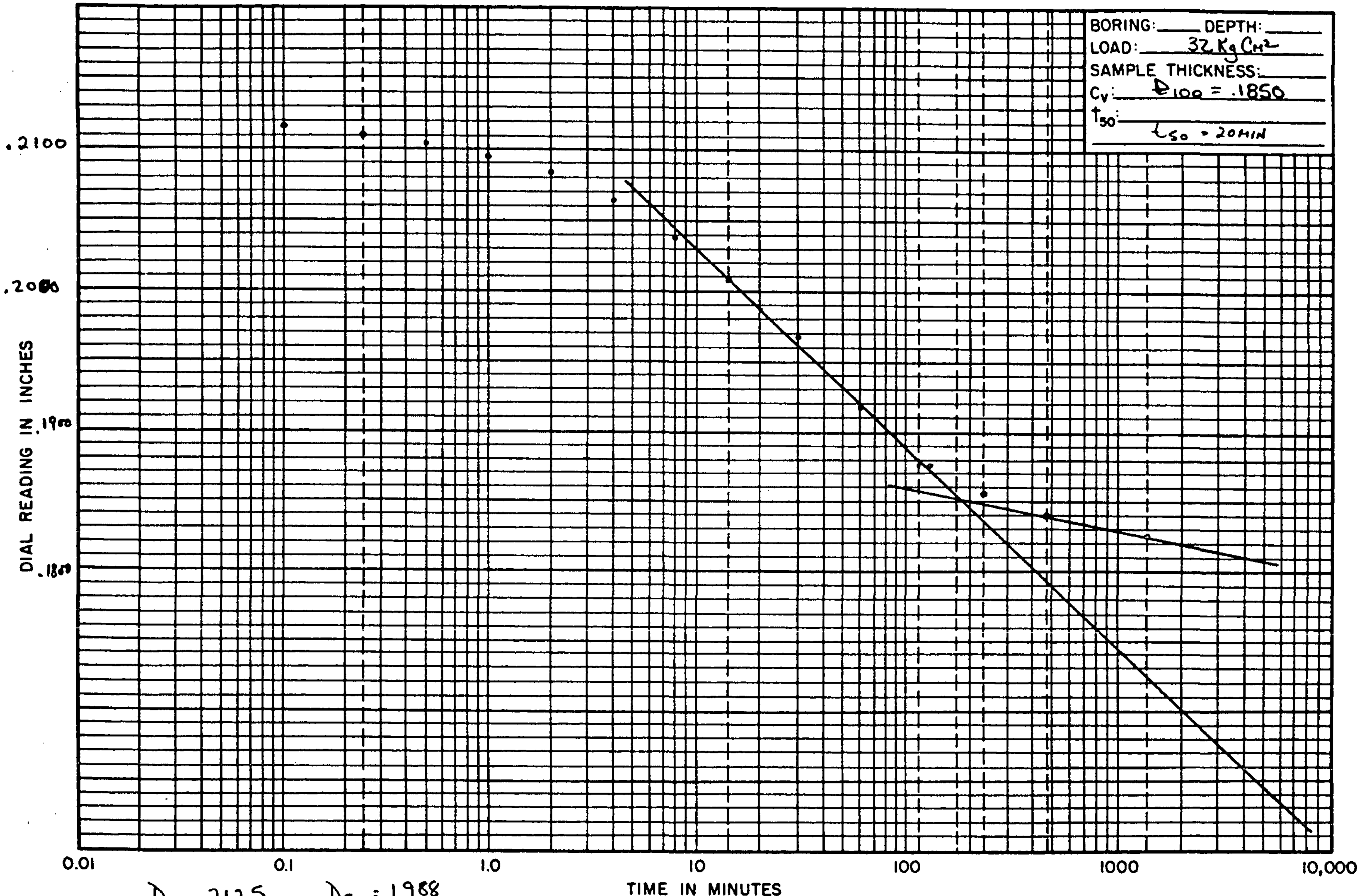


$D_0 = 2125$ $D_{50} = 1988$

$D_{100} = 1850$

CONSOLIDATION TIME CURVE

PLATE

CONSOLIDATION TEST

Version 1.1

JOB NO.: BORING NO.: SAMPLE NO.: DEPTH:

TEST SPECIMEN:

	INITIAL	FINAL
WET WEIGHT + TARE =	133.81	132.94
DRY WEIGHT + TARE =	117.09	117.09
TARE WEIGHT =	59.38	59.38
WATER CONTENT =	29.0%	27.5%

TRIMMINGS:

WET WEIGHT + TARE =	51.53
DRY WEIGHT + TARE =	43.56
TARE WEIGHT =	15.49
WATER CONTENT =	28.4%

SPECIFIC GRAVITY = 2.8000
SAMPLE HEIGHT (IN) = 0.7500
SAMPLE DIAMETER (IN) = 1.9700
SAMPLE VOLUME (CC) = 37.4681
HEIGHT OF SOLIDS (IN) = 0.4126
INITIAL VOID RATIO = 0.8179

DEGREE OF SATURATION:
INITIAL = 99.2%
FINAL = 99.6%

UNIT WEIGHT OF SPECIMEN:
WET (PCF) = 124.0
DRY (PCF) = 96.1

MACHINE READING	PRESSURE KG/CM^2	DIAL READING	CUM. CHANGE	CORR. CHANGE	VOID RATIO	COEFF. IN^2/DAY
-0.0049	4.000	0.2464	0.0056	0.0007	0.816	10.615
-0.0070	8.000	0.2368	0.0152	0.0082	0.798	6.502
-0.0091	16.000	0.2175	0.0345	0.0254	0.756	2.659
-0.0115	32.000	0.1850	0.0670	0.0555	0.683	1.710
-0.0090	8.000	0.2026	0.0494	0.0404	0.720	0.000
-0.0069	2.000	0.2263	0.0257	0.0188	0.772	0.000

Job No. ______

BORING NO: SAMPLE NO:

DEPTH, FT: 80-81

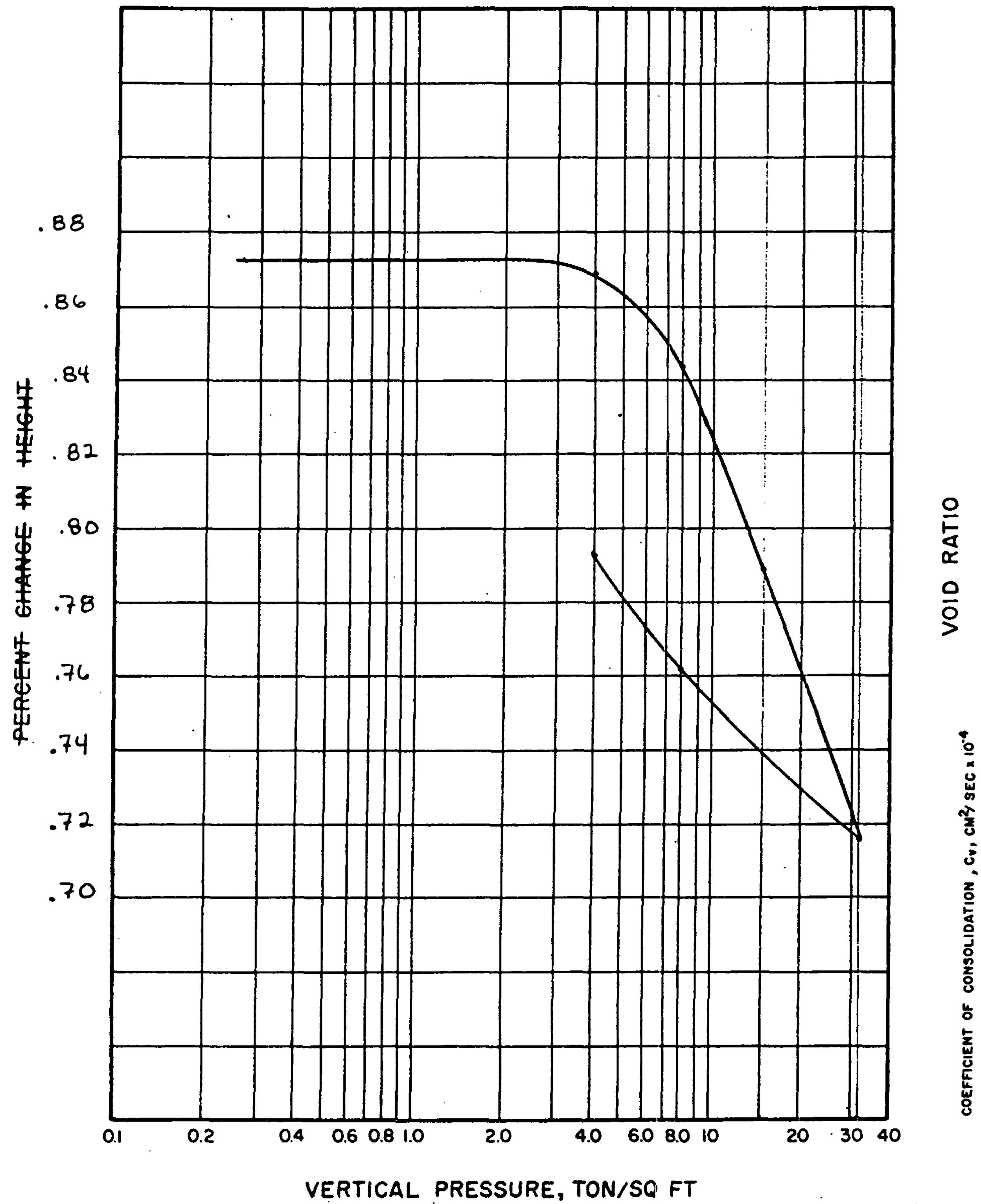
DESCRIPTION: Hard red clay with calcareous nodules, slickensided

UNIT DRY WEIGHT: 93.3 PCF

WATER CONTENT: 27.7 %

LIQUID LIMIT:

PLASTIC LIMIT:



CONSOLIDATION TEST RESULTS

FUGRO GULF, INC.
Consulting Engineers and Geologists

PLATE

ML-126

CONSOLIDATION TEST

Date: ______ Project: REI P10-4 Job No. ______

Boring No. ______ Sample No. ______ Depth: 80-81 Ring No. 3

Description: Vst. red clay w/calc NODS, SLICKENSIDED Liquid Limit ______

Plastic Limit ______

Test Specimen	Initial	Final
Wet wt sple + ring	143.75	142.50
Dry wt sple + ring	126.28	126.28
Wt of ring	70.50	70.50
Dry wt of sple		
Wt of water		
Water content, %		

Trimmings, Can No.	605
Wet wt + tare	64.37
Dry wt - tare	53.67
Tare wt	15.09
Dry wt	
Wt of water	
Water content, %	

A. Specific Gravity ______ B. Volume of Sple 37.318 c.c. C. Initial Ht of Sple 0.747 in.

D. Final Ht of Sple ______ in. E. Unit Wet Wt ______ lb/ft^3 F. Unit Dry Wt ______ lb/ft^3

G. Ht of Solids = $\frac{\text{Final Dry Wt Sple}}{A} \times \frac{C}{B}$ = ______ in. $\frac{1}{G}$ = ______

H. Initial Void Ratio: = $\frac{C - G}{G}$ = ______

d = 1.97

Percent Saturation:

Before Test = $\frac{\text{Initial Wt Water}}{B - \frac{\text{Dry Wt Sple}}{A}} \times 100$ = ______ %

After Test = $\frac{\text{Final Wt Water}}{B \times \frac{D}{C} - \frac{\text{Dry Wt Sple}}{A}} \times 100$ = ______ %

Consolidometer No: *P = $70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N t_{50} min.	P* c_v $in.^2/day$
.0000	0	.2500	—	—					
.0003	.25		—	—					
.0007	.5		—	—					
.0017	1		—	—					
.0035	2		—	—					
.0060	4	.2576	.0076	.0016				5.5	
.0087	8	.2705	.0205	.0118				18.0	
.0110	16	.2945	.0445	.0335				26.0	
.0134	32	.3260	.0760	.0626				28.0	
.0107	8	.3052	.0552	.0445					
.0090	4	.2911	.0411	.0321					

Tested By: [illegible]
Computed By: [illegible]
Checked By: [illegible]

CONSOLIDATION TEST
DATA SHEET

Job No. ______ Boring No. P10-4 Depth 80-81 Consol. No. 3

Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.	Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.
JJN	15Aug	1308	0	.2500	.25KgCm2	JJN	15Aug	1330	0	.2530	4.0KgCm2
			.1	.2508					.1	.2551	
			.25	.2509					.25	.2553½	
			.5	.2510					.5	.2556	
	add	H2O →	1	.2510					1	.2558½	
			2	.2500	SWELL				2	.2561	
			4						4	.2564	
									8	.2568½	
									15	.2571	
									30	.2574½	
								1430	60	.2575½	
JJN		1310	0	.2500	.5KgCm2			1530	120	.2577	
			.1	.2504				1730	240	.2578	
			.25	.2505			16Aug	0800	1110	.2580	
			.5	.2504							
			1	.2503							
			2	.2501	SWELL						
							16Aug	0910	0	.2580	8 KgCm2
									.1	.2609	
		1313	0	.2501	1.0KgCm2				.25	.2612	
			.1	.2510					.5	.2616	
			.25	.2511					1	.2620½	
			.5	.2511½					2	.2626	
			1	.2511½					4	.2633½	
			2	.2511					8	.2649	
			4	.2510	SWELL				15	.2654	
									30	.2667	
									60	.2682	
JJN	15Aug	1315	0	.2510	2.0KgCm2				120	.2699	
			.1	.2525½					240		
			.25	.2527					480	.2709	
			.5	.2528½					1440	.2714	
			1	.2529½							
			2	.2530½							
			4	.2531			17Aug	0810	0	.2714	16KgCm2
			8	.2530					.1	.2748	
			15		SWELL				.25	.2752	
									.5	.2757	
									1	.2763	
									2	.2772	
									4	.2784	
									8	.2800	
									15	.2821	
									30	.2850	
									60	.2884	
									120	.2915	
									240	.2938	
									480	.2957	
							0830	1460	.2963	

M L-126

CONSOLIDATION TEST

Date: ______________ Project: ____________________________ Job No. ____________

Boring No. __________ Sample No. ____________ Depth: ______________ Ring No. ____________

Description: ____ Liquid Limit ____________

____ Plastic Limit ____________

Test Specimen	Initial	Final
Wet wt sple + ring		
Dry wt sple + ring		
Wt of ring		
Dry wt of sple		
Wt of water		
Water content, %		

Trimmings, Can No.	
Wet wt + tare	
Dry wt - tare	
Tare wt	
Dry wt	
Wt of water	
Water content, %	

A. Specific Gravity ________ B. Volume of Sple ______ c.c. C. Initial Ht of Sple __________ in.

D. Final Ht of Sple ________ in. E. Unit Wet Wt ______ lb/ft^3 F. Unit Dry Wt __________ lb/ft^3

G. Ht of Solids $= \dfrac{\text{Final Dry Wt Sple}}{A} \times \dfrac{C}{B} =$ __________ in. $\dfrac{1}{G} =$ __________

H. Initial Void Ratio: $= \dfrac{C - G}{G} =$ __________

Percent Saturation:

Before Test $= \dfrac{\text{Initial Wt Water}}{B - \dfrac{\text{Dry Wt Sple}}{A}} \times 100 =$ ________ %

After Test $= \dfrac{\text{Final Wt Water}}{B \times \dfrac{D}{C} - \dfrac{\text{Dry Wt Sple}}{A}} \times 100 =$ ________ %

Consolidometer No: $^{*}P = 70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N t_{50} min.	P* c_v $in.^2/day$

Tested By: __________
Computed By: __________
Checked By: __________

Job No. ______ FORM ...27

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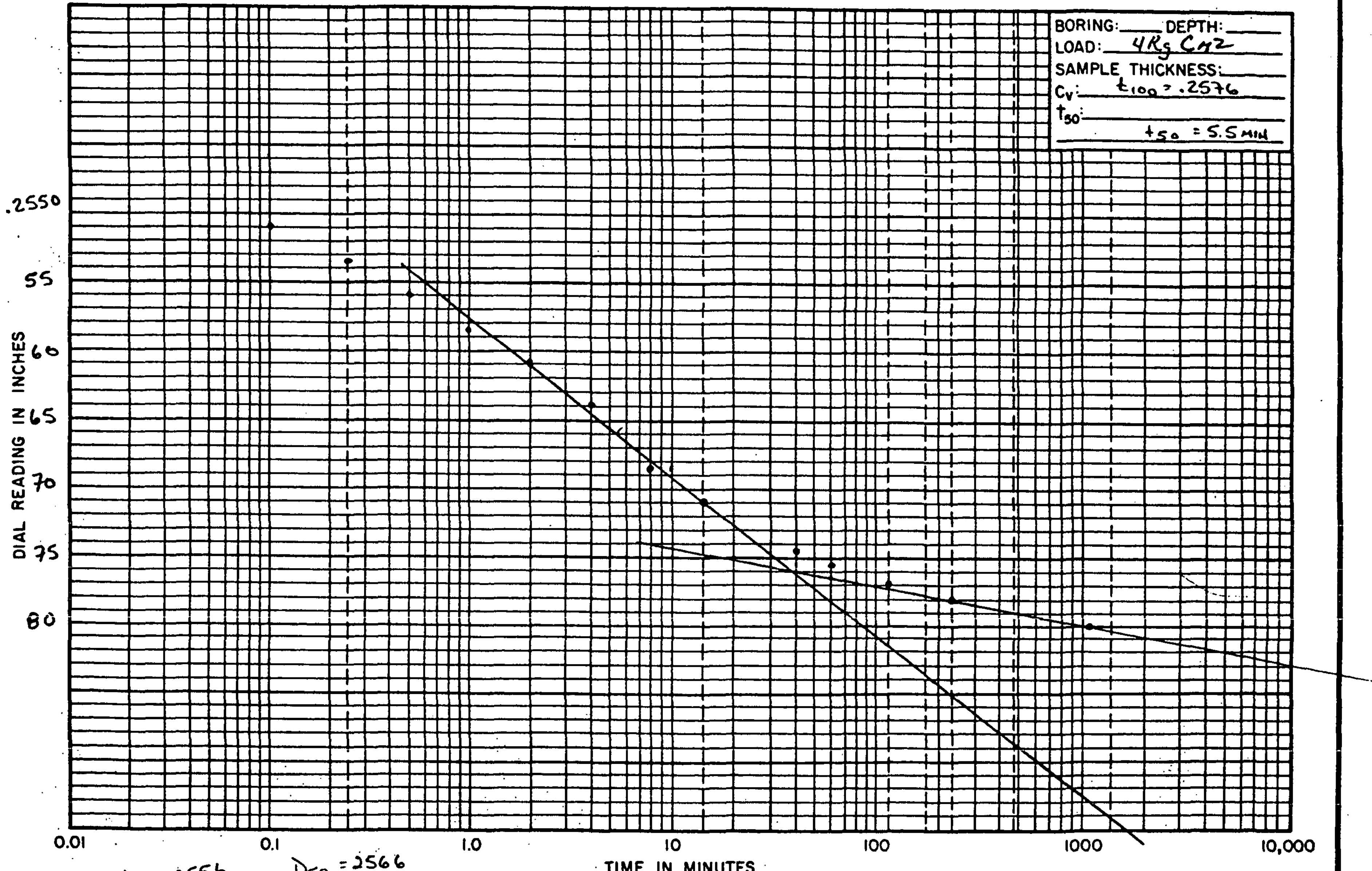

D_o = 2556
D_{100} 2576
D_{50} = 2566

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM

FUGRO GULF, INC.
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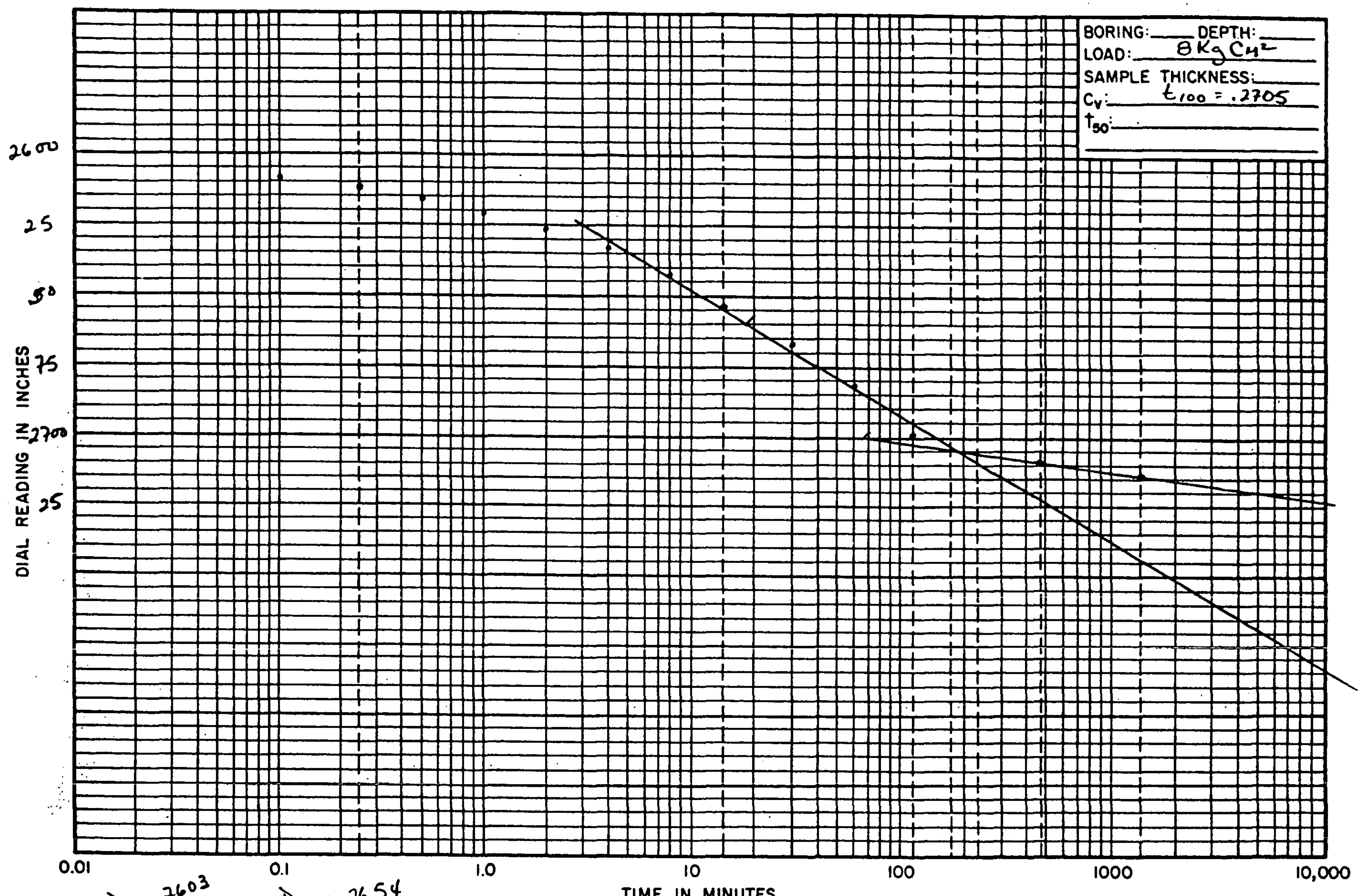


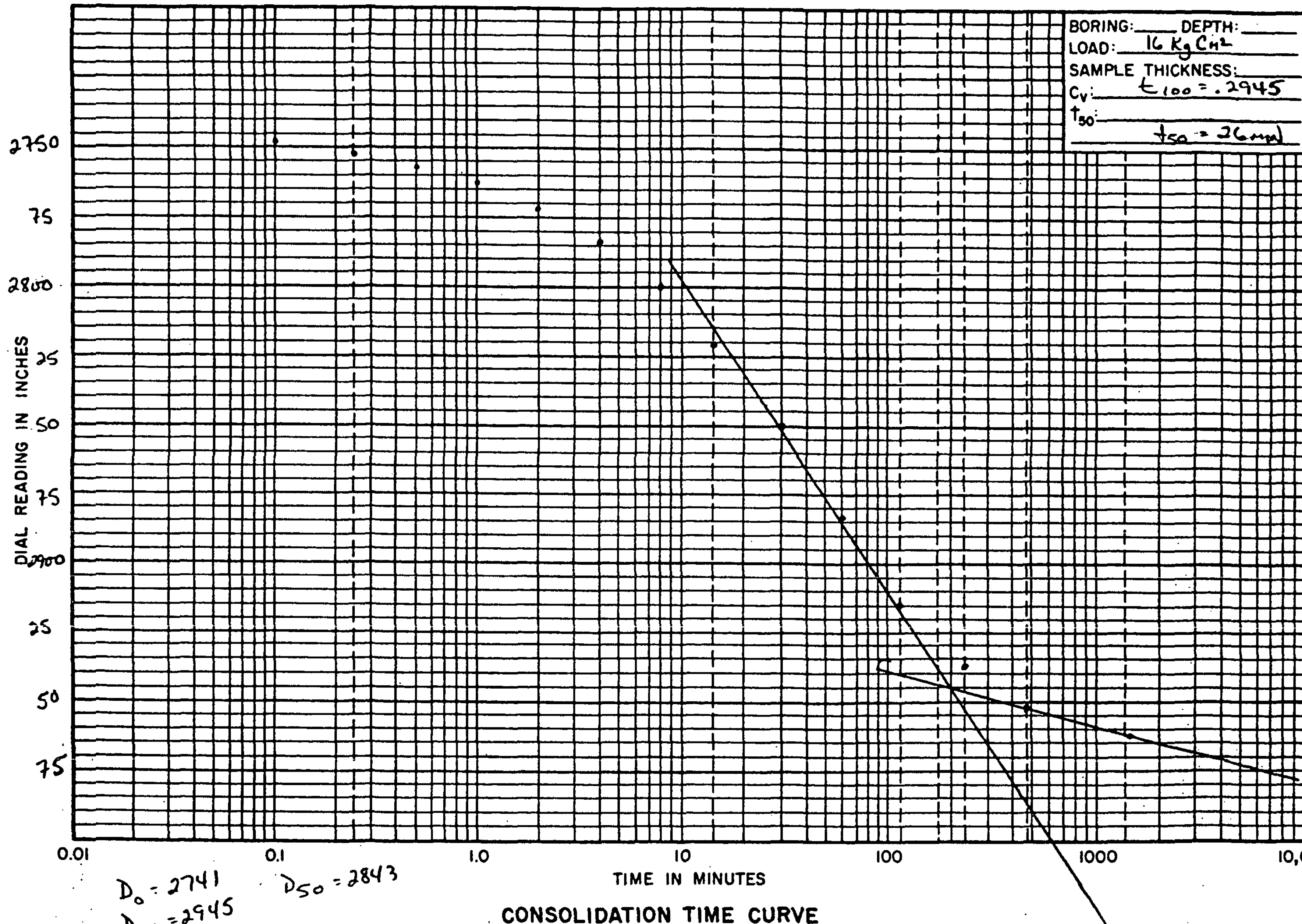
$D_0 = 2603$
$D_{100} = 2705$
$D_{50} = .2654$

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM 27

FUGRO GULF, INC.
Consulting Engineers and Geologists



D0 = 2741 D50 = 2843
D100 = 2945

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM [illegible]27

FUGRO GULF, INC.
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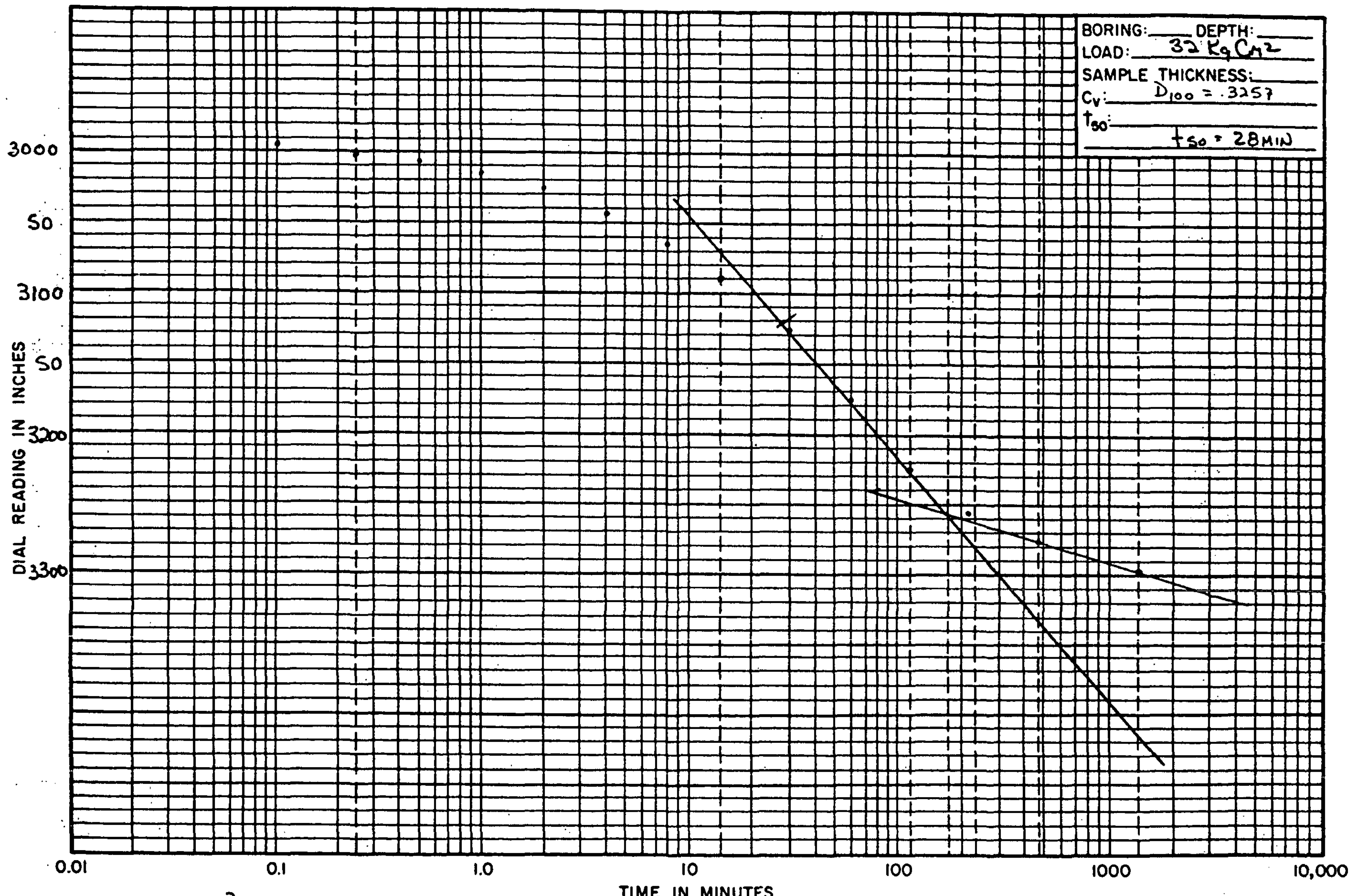


.3257
.2986

CONSOLIDATION TIME CURVE

PLATE

CONSOLIDATION TEST
Version 1.1

JOB NO.: BORING NO.: SAMPLE NO.: DEPTH:

TEST SPECIMEN:

	INITIAL	FINAL
WET WEIGHT + TARE =	143.75	142.50
DRY WEIGHT + TARE =	126.28	126.28
TARE WEIGHT =	70.50	70.50
WATER CONTENT =	31.3%	29.1%

TRIMMINGS:

WET WEIGHT + TARE = 64.37
DRY WEIGHT + TARE = 53.67
TARE WEIGHT = 15.09
WATER CONTENT = 27.7%

SPECIFIC GRAVITY = 2.8000
SAMPLE HEIGHT (IN) = 0.7470
SAMPLE DIAMETER (IN) = 1.9700
SAMPLE VOLUME (CC) = 37.3183
HEIGHT OF SOLIDS (IN) = 0.3988
INITIAL VOID RATIO = 0.8733

DEGREE OF SATURATION:
INITIAL = 100.4%
FINAL = 102.7%

UNIT WEIGHT OF SPECIMEN:
WET (PCF) = 122.5
DRY (PCF) = 93.3

MACHINE READING	PRESSURE KG/CM^2	DIAL READING	CUM. CHANGE	CORR. CHANGE	VOID RATIO	COEFF. IN^2/DAY
-0.0060	4.000	0.2424	0.0076	0.0016	0.869	7.162
-0.0087	8.000	0.2295	0.0205	0.0118	0.844	2.129
-0.0110	16.000	0.2055	0.0445	0.0335	0.789	1.388
-0.0134	32.000	0.1740	0.0760	0.0626	0.716	1.186
-0.0107	8.000	0.1948	0.0552	0.0445	0.762	0.000
-0.0090	4.000	0.2089	0.0411	0.0321	0.793	0.000

BORING NO: SAMPLE NO:

DEPTH, FT: 81-82

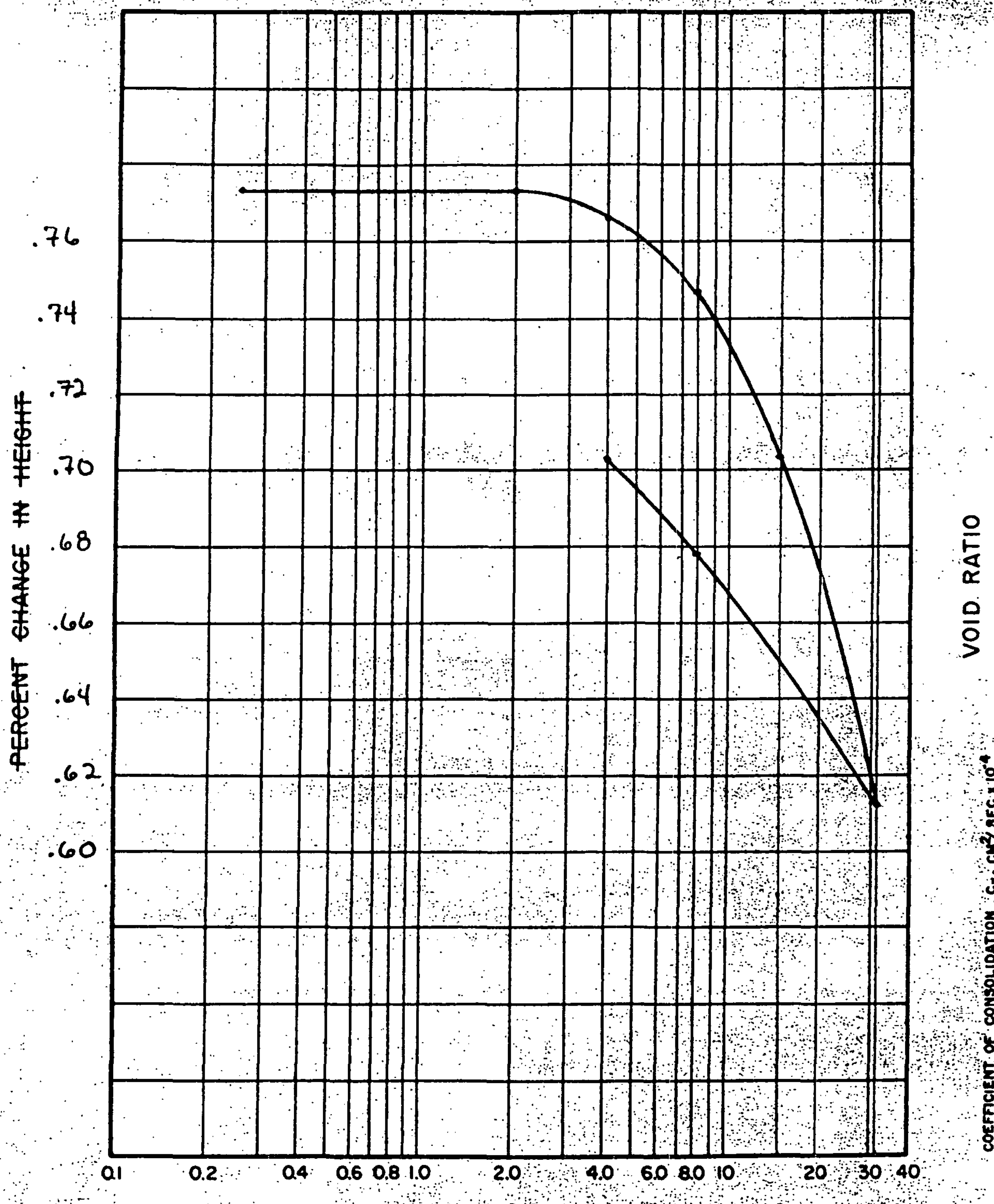
DESCRIPTION: Hard red clay with calcareous nodules, slickensided

UNIT DRY WEIGHT: 98.5 PCF

WATER CONTENT: 25.8 %

LIQUID LIMIT:

PLASTIC LIMIT:



CONSOLIDATION TEST RESULTS

FUGRO GULF, INC.
Consulting Engineers and Geologists

PLATE

Job No. ____

L-126

CONSOLIDATION TEST

Date: 15AUG 85 Project: REI P10-4 Job No. ________

Boring No. ________ Sample No. ________ Depth: 81-82 Ring No. 2

Description: Hard red clay w/calc. material slickensided

Liquid Limit ________

Plastic Limit ________

Test Specimen	Initial	Final
Wet wt sple + ring	146.39	145.42
Dry wt sple + ring	130.43	130.43
Wt of ring	71.27	71.27
Dry wt of sple		
Wt of water		
Water content, %	27.0	25.3

Trimmings, Can No. 400	
Wet wt + tare	57.19
Dry wt - tare	48.65
Tare wt	15.54
Dry wt	
Wt of water	
Water content, %	25.8

A. Specific Gravity 2.80 B. Volume of Sple 37.468 c.c. C. Initial Ht of Sple 0.750 in.

D. Final Ht of Sple ________ in. E. Unit Wet Wt 125.1 lb/ft^3 F. Unit Dry Wt 98.5 lb/ft^3

G. Ht of Solids = $\frac{\text{Final Dry Wt Sple}}{A} \times \frac{C}{B}$ = .4229 in. $\frac{1}{G}$ = ________

H. Initial Void Ratio: = $\frac{C - G}{G}$ = 0.7733

Percent Saturation:

$d = 1.97$

Before Test = $\frac{\text{Initial Wt Water}}{B - \frac{\text{Dry Wt Sple}}{A}} \times 100$ = 97.7 %

After Test = $\frac{\text{Final Wt Water}}{B \times \frac{D}{C} - \frac{\text{Dry Wt Sple}}{A}} \times 100$ = 101.0 %

Consolidometer No:

*$P = 70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N t_{50} min.	P* c_v $in.^2/day$
.0000	0	.2500	—						
.0002	.25	—							
.0008	.5	—							
.0019	1	—							
.0035	2	—							
.0054	4	.2584	.0084	.0030			.766	6.0	6.594
.0073	8	.2686	.0186	.0113			.747	8.0	4.836
.0095	16	.2892	.0392	.0297			.703	14.0	2.452
.0123	32	.3276	.0776	.0653			.612	40.0	0.824
.0100	8	.3005	.0505	.0405			.678		
.0087	4	.2888	.0388	.0301			.702		

Tested By: ________
Computed By: ________
Checked By: ________

CONSOLIDATION TEST
DATA SHEET

Job No. ________ Boring No. P10-4 Depth 81-82 Consol. No. 2

Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.	Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.
JLN	15Aug	1250	0	.2500	.25 Kg/CM^2	JLN	15Aug86	1320	0	.2529	4 Kg/Cm^2
			.1	.2508					.1	.2551	
			.25	.2509					.25	.2554	
			.5	.2510					.5	.2556½	
	add H_2O →		1	.2511					1	.2559	
			2	.2500	SWELL				2	.2562	
									4	.2565	
									8	.2568	
									15	.2571	
		1253	0	.2500	.5 Kg/CM^2				30	.2573½	
			.1	.2504				1420	60	.2575½	
			.25	.2504½				1520	120	.2577	
			.5	.2504				1720	240	.2578	
			1	.2503			16Aug	0800	1120	.2580	
			2	.2501	SWELL						
						JLN	16Aug	0905	0	.2580	8 Kg/Cm^2
									.1	.2610	
JLN	15Aug	1255	0	.2501	1.0 Kg/Cm^2				.25	.2613½	
			.1	.2511					.5	.2617½	
			.25	.2512					1	.2623	
			.5	.2512½					2	.2629	
			1	.2513					4	.2636½	
			2	.2512					8	.2646	
			4	.2511	SWELL				15	.2656	
									30	.2668½	
									60	.2678	
									120	.2687	
									240		
JLN	15Aug	1300	0	.2511	2.0 Kg/Cm^2				480	.2693	
			.1	.2525			17Aug	0800	1380	.2698	
			.25	.2527							
			.5	.2528½							
			1	.2529½							
			2	.2530½			17Aug	0805	0	.2698	16 Kg/Cm^2
			4	.2531					.1	.2735	
			8	.2531					.25	.2741	
			15	.2529½	SWELL				.5	.2747½	
									1	.2755	
									2	.2763	
									4	.2775	
									8	.2791	
									15	.2810	
									30	.2837	
									60	.2862	
									120	.2880	
									240	.2892	
									480	.2900	
							18Aug	0835		.2909	

L-126

CONSOLIDATION TEST

Date:__________ Project:____________________ Job No.__________

Boring No.________ Sample No.________ Depth:________ Ring No.________

Description:________________________ Liquid Limit ________

________________________ Plastic Limit ________

Test Specimen	Initial	Final
Wet wt sple + ring		
Dry wt sple + ring		
Wt of ring		
Dry wt of sple		
Wt of water		
Water content, %		

Trimmings, Can No.	
Wet wt + tare	
Dry wt - tare	
Tare wt	
Dry wt	
Wt of water	
Water content, %	

A. Specific Gravity________ B. Volume of Sple______ c.c. C. Initial Ht of Sple________ in.

D. Final Ht of Sple________ in. E. Unit Wet Wt______ lb/ft^3 F. Unit Dry Wt________ lb/ft^3

G. Ht of Solids = $\frac{\text{Final Dry Wt Sple}}{A} \times \frac{C}{B}$ = ________ in. $\frac{1}{G}$ = ________

H. Initial Void Ratio: = $\frac{C - G}{G}$ = ________

Percent Saturation:

Before Test = $\dfrac{\text{Initial Wt Water}}{B - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ________ %

After Test = $\dfrac{\text{Final Wt Water}}{B \times \dfrac{D}{C} - \dfrac{\text{Dry Wt Sple}}{A}} \times 100$ = ________ %

Consolidometer No: $^{*}P = 70.9(C-J)^2/N$

Load No. or Gage Reading	Pressure T/ft^2	Dial Reading in.	J' Cum. Dial Change in.	J Corr. Dial Change in.	K Cons. in./in. = J/C	L Void Ratio Change = J/G	M Void Ratio = H-L	N t_{50} min.	P* c_v $in.^2/day$

Tested By:________
Computed By:________
Checked By:________

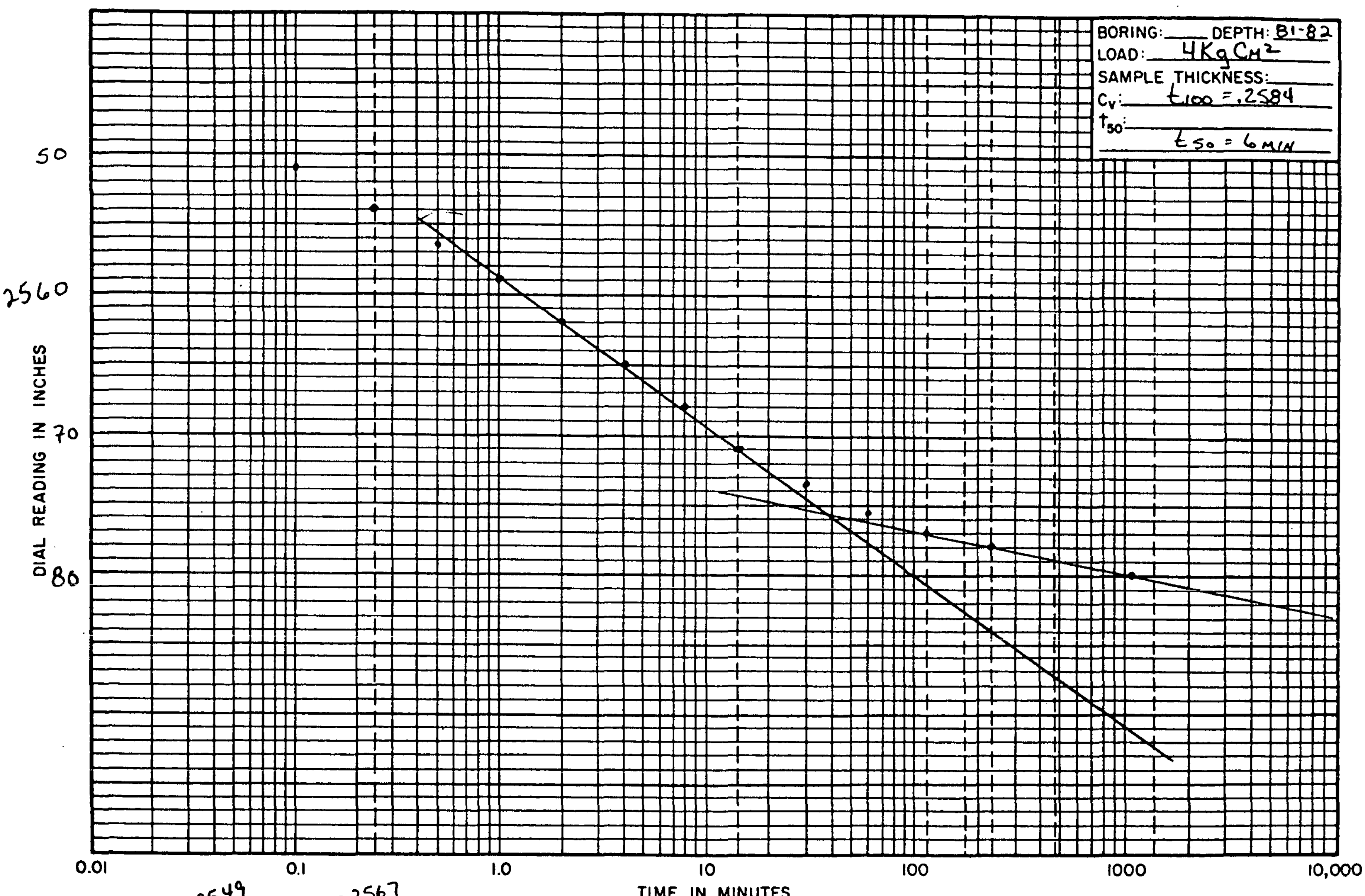
CONSOLIDATION TEST
DATA SHEET

Job No. ________ Boring No. ________ Depth ________ Consol. No. ________

Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.	Observ. By	Date	Time	Elapsed Time min.	Dial Reading in.	Load No.
B.T.	19 Aug	0935	0	.2945	32 Kg/cm²						
			.1	.2952							
			.25	.2958							
			.5	.2966							
			1	.2971							
			2	.2980							
			4	.2997½							
			8	.3021½							
			15	.3051							
			30	.3091							
			60	.3132							
		1135	120	.3162½							
			240	.3180							
		1645	430	.3191							
		0810		.3204							
	Rebound										
B.T.	20 Aug	0810	0	.3204	8 Kg/cm²						
B.T.	21 Aug	0820	1450	.3005							
	Rebound										
	21 Aug	0835	0	.3005	4 Kg/cm²						
	22 Aug	1130		.2888							

Job No. ______ FORM ...27

FUGRO GULF, INC.
Consulting Engineers and Geologists



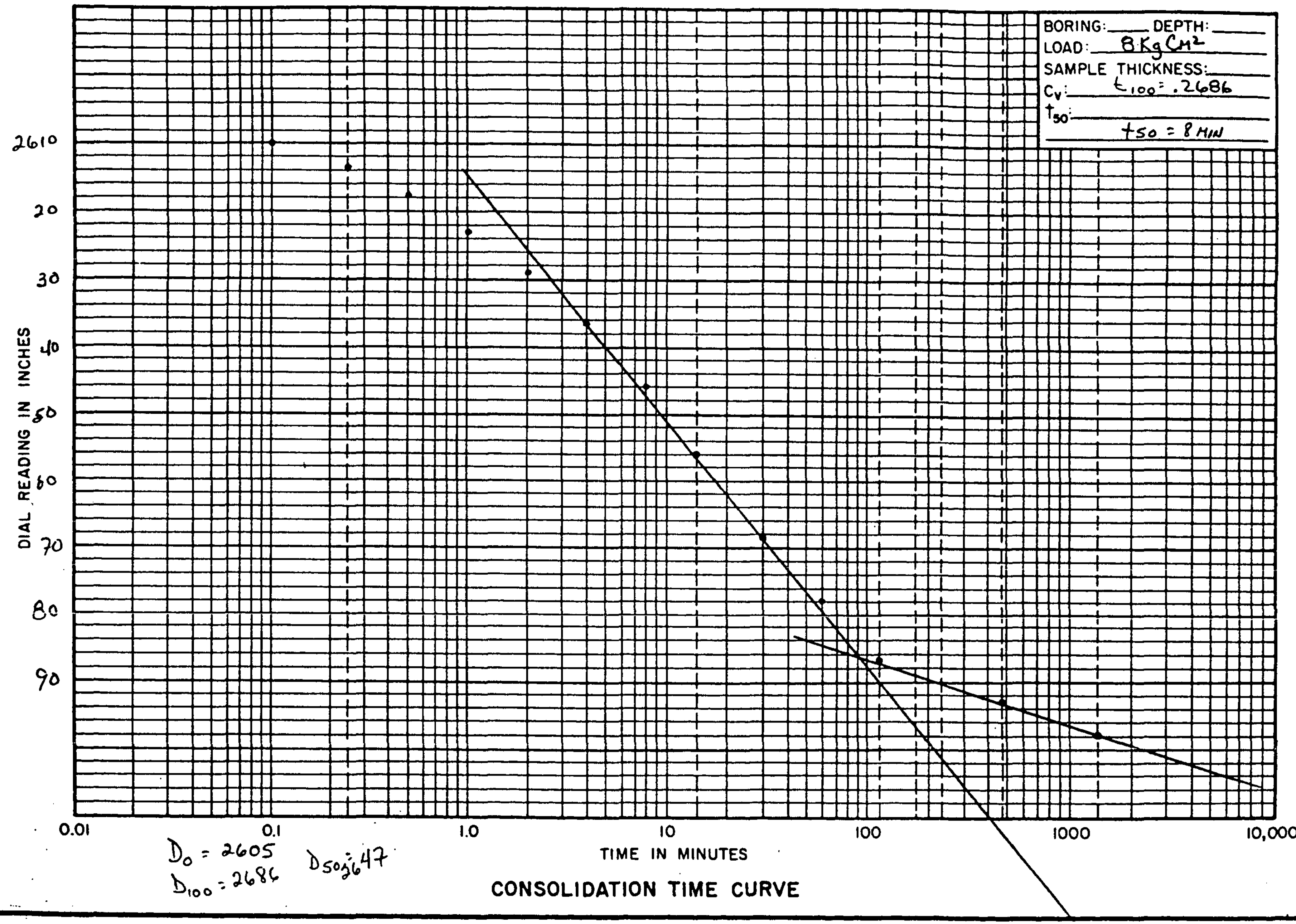
$D_0 = 2549$ $D_{50} = 2567$
D_{100} 2584

CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM [illegible]27

FUGRO GULF, INC.
Consulting Engineers and Geologists

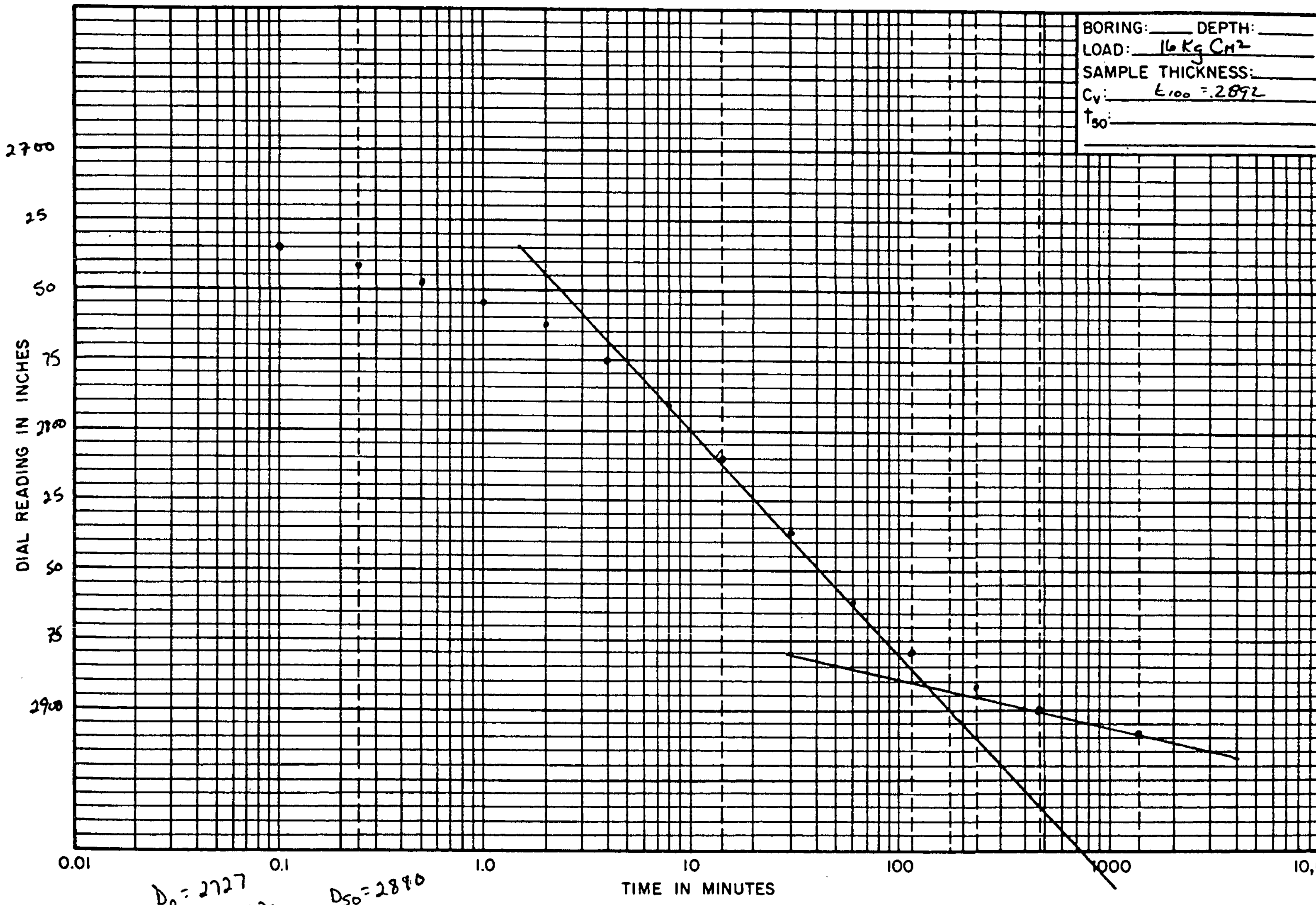


CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM [illegible]27

FUGRO GULF, INC.
Consulting Engineers and Geologists

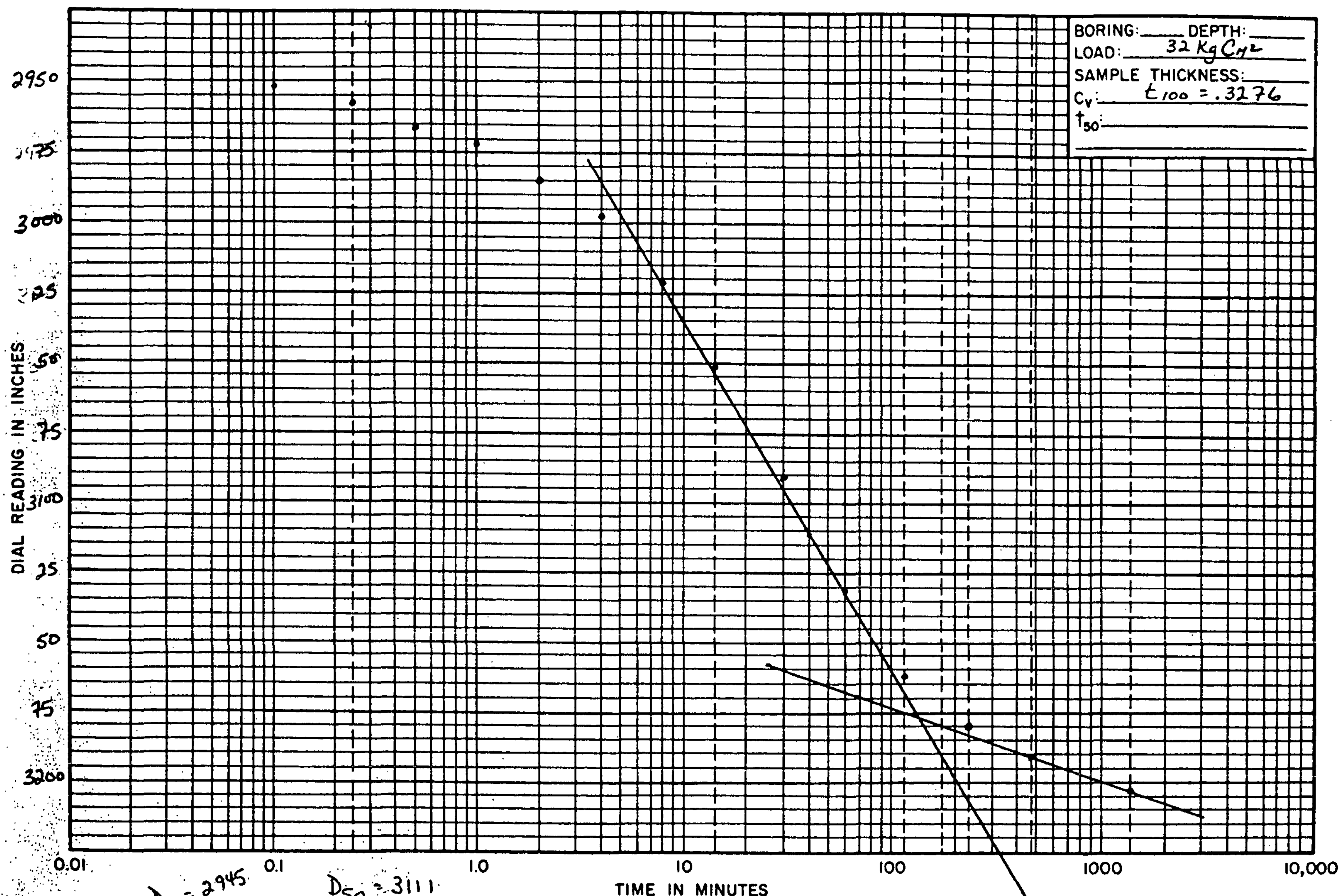


CONSOLIDATION TIME CURVE

PLATE

Job No. ______ FORM [illegible]7

FUGRO GULF, INC.
Consulting Engineers and Geologists



$D_o = 2945$ $D_{50} = 3111$
$D_{100} = 3276$

CONSOLIDATION TIME CURVE

PLATE

CONSOLIDATION TEST
Version 1.1

JOB NO.: BORING NO.: SAMPLE NO.: DEPTH:

TEST SPECIMEN:

	INITIAL	FINAL
WET WEIGHT + TARE =	146.39	145.42
DRY WEIGHT + TARE =	130.43	130.43
TARE WEIGHT =	71.27	71.27
WATER CONTENT =	27.0%	25.3%

TRIMMINGS:

WET WEIGHT + TARE =	57.19
DRY WEIGHT + TARE =	48.65
TARE WEIGHT =	15.54
WATER CONTENT =	25.8%

SPECIFIC GRAVITY = 2.8000
SAMPLE HEIGHT (IN) = 0.7500
SAMPLE DIAMETER (IN) = 1.9700
SAMPLE VOLUME (CC) = 37.4681
HEIGHT OF SOLIDS (IN) = 0.4229
INITIAL VOID RATIO = 0.7733

DEGREE OF SATURATION:
INITIAL = 97.7%
FINAL = 101.0%

UNIT WEIGHT OF SPECIMEN:
WET (PCF) = 125.1
DRY (PCF) = 98.5

MACHINE READING	PRESSURE KG/CM^2	DIAL READING	CUM. CHANGE	CORR. CHANGE	VOID RATIO	COEFF. IN^2/DAY
-0.0054	4.000	0.2416	0.0084	0.0030	0.766	6.594
-0.0073	8.000	0.2314	0.0186	0.0113	0.747	4.836
-0.0095	16.000	0.2108	0.0392	0.0297	0.703	2.452
-0.0093	32.000	0.1724	0.0776	0.0683	0.612	0.824
-0.0100	8.000	0.1995	0.0505	0.0405	0.678	0.000
-0.0087	4.000	0.2112	0.0388	0.0301	0.702	0.000

Appendix 11

Alluvial Remnant Peizometer Construction Logs

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

Sheet 1 of 1

LITHOLOGIC LOG AND CONSTRUCTION OF MR-1

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: MR-1
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 8/11/86 Date Completed: 8/11/86
Method: CFA Total Depth: 7.76'

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 5.30'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 4.61

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 16.60							
0	SAND - NOTED IN CUTTINGS, AND LOGS OF R-1 (30' SW) CPT-10 (20's), GW02, and GW07	8.84						▼
10	TD 7.76'. BORING (8") ADVANCED TO 7.0', WELL SUNK .76' WHEN PLACED IN SOFT SAND. SET WITH FLUSH VALUE, 4" SCH 40 PVC FLUSH JOINTED CASING, AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT CAP. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

Sheet 1 of 1

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF MR-2

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: MR-2
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 8/18/86 Date Completed: 8/18/86
Method: MR Total Depth: 20.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 17.98'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 5.00'

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 10.30							
0	TOPSOIL, black, root fragments, sandy clay	8.3	1	ST	20			
	SLIGHTLY SILTY SAND, gray, medium to fine grained, damp		2	SS	20			
			3	SS	53			
		2.3	4	SS	67			
	VERY SANDY CLAY, gray and ocre, medium grains	3	5	SS	73			
10	SAND, tan to pale gray, fine to medium grained quartz, multicolored pebbles, wet		6	SS	33			
			7	SS	60			
		-3.7	8	SS	27			
	VERY SILTY SAND, gray, very fine grained, wet		9	SS	67			
20		-7.7	10	ST	NR			
	SILTY CLAY, red, some black pinpoints, calcareous pebbles	-9.7	11	ST	80			

T.D. 20.0'. BORING (3-7/8") ADVANCED TO 20.', SAMPLE PUSHED 20-22' BORING (8") OVERREAMED TO 20.0. MONITOR WELL SET WITH FLUSH VALUE, 4" SCH 40 PVC FLUSH JOINTED CASING AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT CAP. WELL CAPPED AND VENTED. LOCKING PROTECTIVE CASING SET IN GROUT. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF MR-3

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: MR-3
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION

Date Started: 8/18/86 Date Completed: 8/18/86
Method: MR Total Depth: 20.0 FEET

WELL COMPLETION INFORMATION

Screen Dia.: 4" Length: 17.49'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 5.00'

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 9.20							
0	SAND-NOTED IN CUTTINGS, DRILLING RATE, AND CPT-5, APPROXIMATELY 30' SOUTH OF R-3							
10								
		-10.6	1	ST	NR			
20	SILTY CLAY, brown, some gray pockets	-12.8	2	ST	85			
	T.D. 20.0'. BORING (3-7/8") ADVANCED TO 18', SAMPLES PUSHED 18-22'. BORING (8") OVERREAMED TO 20.0'. MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING, AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT CAP. LOCKING PROTECTIVE CASING SET IN GROUT. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

SAMPLER TYPE

SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD

HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

Sheet 1 of 1

LITHOLOGIC LOG AND CONSTRUCTION OF MR-4

Client: FRENCH TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: MR-4
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 8/18/86 Date Completed: 8/18/86
Method: MR Total Depth: 20.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 18.45'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 5.00'

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 9.50							
0	SAND - NOTED IN CUTTING, DRILLING RATE, AND CPT-8, APPROXIMATELY 30' SOUTH OF R-4							
20	VERY SILTY CLAY, reddish brown, some gray mottling and black pinpoints	-10.5						
		-12.3	1	ST	80			
	T.D. 20.5'. BORING (3-7/8") ADVANCED TO 20', SAMPLE PUSHED 20-22'. BORING (8") OVERREAMED TO 20.5'. MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING, AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT CAP. LOCKING PROTECTIVE CASING SET IN GROUT. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

Appendix 12

Monitor Wells and Piezometer Construction Logs

WELL ELEVATION SURVEY
FRENCH LIMITED WASTE HAZARD SITE
JOB NO. 86.055

AUGUST 22, 1986

TBM "C"	11363.16	10,056.05	14.64 (RR SPIKE C GOLF PUMP RD. APPR. 200' E. MAPLE ST.)	
WELL SITE	EASTING	NORTHING	ELEVATION	S.U.
REI-10-1 (16)	12,102.42	10,108.71	12.8 (N.G.) 14.40 (top PVC @ bottom notch)	1.60
REI-10-2 (15)	12,109.56	10,084.34	11.9 (N.G.) 14.26 (top PVC @ bottom notch)	2.36
REI-10-3 (18)	12,047.35	10,141.01	13.8 (N.G.) 15.76 (top PVC @ bottom notch)	1.96
REI-10-4 (19)	12,120.28	10,138.40	14.4 (N.G.) 16.19 (top PVC @ bottom notch)	1.79
REI-3-5 (26)	12,598.86	9,495.79	10.0 (N.G.) 11.76 (top PVC @ bottom notch) 12.13 (top casing)	1.76
REI-#1 (12)	11,611.15	9,745.75	16.6 (N.G.) 18.75 (top PVC @ bottom notch)	2.15
REI-#2 (13)	11,633.32	10,094.03	10.3 (N.G.) 13.28 (top PVC @ bottom notch)	[illegible]
REI-#3 (14)	11,722.56	10,086.34	9.2 (N.G.) 11.69 (top PVC @ bottom notch)	2.47
REI-#4 (22)	11,943.57	10,094.28	9.5 (N.G.) 12.45 (top PVC @ bottom notch)	2.95
REI-12-1 (10)	10,739.44	10,715.92	10.5 (N.G.) 12.52 (top PVC @ bottom notch)	2.02
REI-12-2 (11)	10,732.74	10,733.19	10.4 (N.G.) 12.26 (top PVC @ bottom notch)	1.86
REI-11 (25)	12,503.10	9,958.88	9.9 (N.G.) 11.79 (top PVC @ bottom notch)	1.89
P-10-2 (20)	12,116.62	10,123.96	13.8 (N.G.) 15.76 (top PVC @ paint mark)	1.96
P-10-3 (17)	12,094.04	10,127.11	13.4 (N.G.) 15.44 (top PVC @ bottom notch)	2.04
P-10-4 (21)	12,120.51	10,117.36	13.7 (N.G.) 15.22 (top PVC @ bottom notch)	1.52

#10 CLUSTER

#10 CLUSTER PIEZO

JWM:bgb
86.055bm

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 3-5

Client: FRENCH LTD.
Project Name: French Ltd.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: REI 3-5
Logged By: P. Mann, Hydrogeologist
Approved By:
Drilled By: Southwest Labs/Gulf Coast Coring

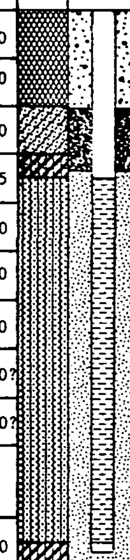
DRILLING AND SAMPLING INFORMATION
Date Started: 7/15/86 Date Completed: 7/18/86
Method: Rotary Wash Total Depth: 23.0'

WELL COMPLETION INFORMATION
Screen Dia.: 4 in Length: 15.75'
Slot Size: .010 in Type: PVC Schedule 40
Casing Dia.: 4 in Length: 8.85'

DEPTH IN FEET	DESCRIPTION (SURFACE ELEVATION)	STRATUM ELEVATION IN FEET
0	TOPSOIL, CLAYEY SILT TO SILTY CLAY, brown and gray, mottled, with roots	4.0
5	CLAYEY SAND, brown and gray, mottled, moderately soft, moist	6.0
	SANDY CLAY WITH SILT, brown and gray, mottled, firm	7.1
10, 15, 20	SILTY SAND TO SAND, fine to coarse grained, gray, wet 12.0 to 14.5' with pebbles (fine gravel), subrounded below 14.5' brown to grayish brown, mostly medium grained at 16-18' interval caving sands making continuous sampling difficult, drilled to 21.0' and then sampled	22.3
	SILTY CLAY, brown and gray, mottled, moderately firm	23.0
25	BORING COMPLETED TO 23.0' DEPTH USING 3-1/2" BIT ON 7/15/86. ON 7/18/86, BOREHOLE WAS REAMED OUT USING 7-7/8" BIT AND THEN THE MONITOR WELL WAS INSTALLED	

SAMPLE NO.	SAMPLE TYPE	RECOVERY
0-2	ST	1.10
2-4	ST	1.10
4-6	ST	1.40
6-8	ST	1.25
8-10	SS	1.60
10-12	SS	1.50
12-14	SS	1.50
14-16	SS	1.60?
16-18	SS	1.60?
21-23	ST	1.90

GRAPHIC LOG / WELL COMPLETION / WATER LEVEL



W. L. Collected 8-11-86

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 10-1

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: 10-1
Logged By: S. L. Baird
Approved By:
Drilled By: SWL & GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 7/21/86 Date Completed: 7/28/86
Method: MR Total Depth: 153.5' FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 25.3'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" & 8" Length: 124.3/56

SURFACE ELEVATION 12.80

DESCRIPTION	STRATUM ELEVATION IN FEET
SURFACE FILL, gravel, asphalt, rubber	7.8
SAND AND GRAVEL, brown, medium grained, 10% fines, wet, odor	4.5
SLIGHTLY CLAYEY SAND, olive, fine grained	3
SILTY SAND, medium to dark gray, fine to medium grained, odor, wet	-20.2
VERY SANDY SILT, tan, some dark staining, odor	-21.2
CLAYEY SILT, dark gray	-23.1
SILTY SAND, dark gray, wet, odor	-29.7
VERY SILTY CLAY, grayish green, some brown lenses of clayey sand	-33.5
SILTY SAND/SANDY SILT, olive gray, odor	-38.7
SILTY CLAY, olive, blue, red mottles, gray silty sand lenses, odor EIGHT INCH SURFACE CASING SET @ 56.0' calcareous nodules and clayey silt with depth	-64.2
CLAY, very stiff, red	-75.7
SANDY SILT, grayish green	-87.2
SANDY SILT/SILTY SAND	-91.7
CLAY	-97.2
INTERBEDDED CLAY AND SAND	

SAMPLE NO.	SAMPLE TYPE	% RECOVERY
1	PT	NR
2	SS	33
3	SS	53
4	SS	53
5	PT	37
6	PT	47
7	PT	NR
8	SS	60
9	SS	60
10	SS	67
11	SS	73
12	SS	67
13	SS	67
14	SS	80
15	SS	80
16	SS	80
17	SS	80
18	SS	47
19	SS	100
20	PT	13
21	PT	17
22	PT	33
23	PT	57
24	PT	50

DEPTH IN FEET: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120

GRAPHIC LOG | WELL COMPLETION | WATER LEVEL

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No. 275-14 Boring No. 10-1

CONTINUATION OF REI 10-1

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
120		-109.7						
	SAND, SILTY SAND AND GRAVELS							
130								
140								
150								
	GRAVELLY CLAY, blue green	-139.7	25	SS	53			
		-140.7						
160	TD 153.5 BORING (3-7/8") ADVANCED TO 152', SAMPLE PUSHED 152-153.5. BORING (7-1/2") OVER REAMED TO 148.0'. EIGHT INCH PVC CASING (COUPLED WITH STAINLESS STEEL SCREWS) SET AT 56 FEET. FOUR INCH MONITOR WELL SET WITH FLUSH VALVE, 4" PVC FLUSH JOINTED CASING AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL, GROUTED TO SURFACE WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 10-2

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: 10-2
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 8/8/86 Date Completed: 8/8/86
Method: MR Total Depth: 48.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 13.75'
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 36.61

SURFACE ELEVATION 11.90

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
0	SAND AND GRAVEL	2.9						
10	SLIGHTLY CLAYEY SAND	.9						
	SILTY SAND	-16.1						
30	SILTY CLAY	-20.1						
	SILTY SAND, gray green, strong odor, wet		1	SS	67			
			2	SS	40			
40		-30.1	3	SS	80			
	SLIGHTLY CLAYEY SAND, gray with yellowish brown stain, some lignite chips		4	SS	47			
		-35.1	5	SS	27			
	SILTY CLAY	-36.1	6	SS	67			
			7	SS	100			

50

TD 48.0 BORING (8") DRILLED TO 36'. CONTINUOUSLY SAMPLED IN 3-7/8" BORING TO 49.5. UPPER HOLE COMPARED WITH CONTINUOUS SAMPLE LOG FROM ADJACENT 10-1. ELECTRIC LOGGED. FOUR INCH MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING, AND 0.010" SLOT SCREEN #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL GROUTED TO SURFACE WITH CEMENT/ BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

Sheet 1 of 1

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 10-3

Client FRENCH LTD. TASK GROUP
Project Name French Ltd. 1986 F.I.
Project Location Crosby, Texas
Job No. 275-14 Boring No. 10-3
Logged By S. L. Baird
Approved By
Drilled By SWL

DRILLING AND SAMPLING INFORMATION
Date Started 7/27/86 Date Completed 7/27/86
Method MR Total Depth 48.0 FEET

WELL COMPLETION INFORMATION
Screen Dia. 4" Length 10.30'
Slot Size 0.010" Type PVC
Casing Dia. 4" Length 39.66

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 13.80							
0	SURFACE FILL AND GRAVEL	10.7						
	SAND AND GRAVEL	4.3						
10	SLIGHTLY CLAYEY SAND	2.6						
	SILTY SAND	-18.6						
	SANDY SILT/CLAYEY SILT	-24.2						
40	SILTY SAND/SANDY SILT	-33.7						
	VERY SILTY CLAY, reddish brown	-34.2	1	SS	53			
50	TD 48.0 BORING (8") DRILLED TO 48'. ELECTRIC LOGGED AND COMPARED WITH CONTINUOUS SAMPLE LOG FROM ADJACENT 10-1. FOUR INCH MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING, AND 0.010" SLOT SCREEN #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED TO SURFACE WITH CEMENT/BENTONITE SLURREY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

Sheet 1 of 1

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 10-4

Client FRENCH LTD. TASK GROUP
Project Name French Ltd. 1986 F.I.
Project Location Crosby, Texas
Job No. 275-14 Boring No. 10-4
Logged By S. L. Baird
Approved By
Drilled By SWL

DRILLING AND SAMPLING INFORMATION
Date Started 7/28/86 Date Completed 7/28/86
Method MR Total Depth 46.0 FEET

WELL COMPLETION INFORMATION
Screen Dia. 4" Length 12.80'
Slot Size 0.010" Type PVC
Casing Dia. 4" Length 36.99

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 14.40							
0	SURFACE FILL, rubber	8.4						
	SAND AND GRAVEL	5.9						
10	CLAYEY SAND	1.9						
20	SILTY SAND	-14.1						
30	SANDY SILT	-7.1						
	CLAYEY SILT	-20.6						
	SLIGHTLY SILTY CLAY	-22.6						
40	SILTY SAND/SANDY SILT	-33.6						
50	TD 48.0 BORING (8") DRILLED TO 48.0'. ELECTRIC LOGGED AND COMPARED WITH CONTINUOUS SAMPLE LOG FROM ADJACENT 10-1. FOUR INCH MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING AND 0.010" SLOT SCREEN #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED TO SURFACE WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.							

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI P10-2

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: P10-2
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 8/8/86 Date Completed: 8/9/86
Method: MR Total Depth: 92.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 2.01
Slot Size: 0.010" Type: PVC
Casing Dia.: 14" & 16" Length: 91.95

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 13.80							
0								
10	BORING ADVANCED TO 75' BEFORE TAKING SAMPLES							
20								
30								
40								
50								
60								
70		-61.2						
	SILT AND SILTY CLAY, blue and red, calcareous nodules		1	ST	50			
		-64.2	2	SS	NR			
80	SILTY CLAY, red with blue veining, same calcareous chips in isolated pockets		3	SS	75			
			4	ST	50			
			5	ST	100			
			6	ST	75			
	increasing silt		7	ST	50			
90		-76.7	8	SS	100			
	CLAYEY SILT, dark green, damp	-78.7	9	SS	100			

TD 92.0. SIX INCH CASING SET TO 80'. TWO INCH SCREEN SET WITH CAP ON BOTTOM COUPLED WITH SLIP COUPLINGS AND STAINLESS STEEL SCREWS TO 1-1/4" FLUSH JOINTED RISER PIPE. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI P10-3

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: P10-3
Logged By: S. L. Baird
Approved By:
Drilled By: GCC

DRILLING AND SAMPLING INFORMATION
Date Started: 7/29/86 Date Completed: 7/31/86
Method: MR Total Depth: 84.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 2" Length: 2.00
Slot Size: 0.010" Type: PVC
Casing Dia.: 2" & 6" Length: 82.04

SURFACE ELEVATION 13.40

Description	Stratum Elevation in Feet	Sample No.	Sample Type	% Recovery
ASPHALT AND RUBBER FILL, black, gray and white	8.4	1	ST	40
		2	ST	60
VERY SILTY SAND, gray, fine grained, saturated	.4	3	SS	80
SLIGHTLY SILTY SAND, orange and dark gray, black staining, medium to fine grain		4	ST	65
		5	ST	45
SAMPLING DISCONTINUED DUE TO EXCESSIVE SLOUGHING OF SIDE WALL AND CIRCULATION LOSS PROBLEMS				
SANDY CLAY, gray	-34.6	6	ST	--
SILTY CLAY, gray and brown	-40.6	7	ST	--
		8	ST	75
		9	ST	75
SANDY CLAY, brown	-44.1	10	ST	50
		11	ST	50
SILTY CLAY, red and brown horizontal bands with gray silt partings. Some ferrous stains, black staining, odor	-53.9	12	ST	95
		13	ST	100
		14	ST	75
		15	ST	60
		16	ST	60
VERY SILTY CLAY, blue and red mottles	-56.6	17	ST	65
SLIGHTLY SILTY CLAY, dark brownish red	-59.6	18	ST	75
SANDY CLAY, blue and red, strong odor	-63.6	19	ST	25
		20	ST	75
SILTY CLAY, dark red, calcareous nodules, stiff	-70.6	21	ST	75
		22	ST	75
		23	ST	75

TD 84.0'. SIX INCH CASING SET TO 80.0'. TWO INCH, 0.010" SLOT SCREEN SET WITH CAP ON BOTTOM. FLUSH JOINTED TRILOC PVC RISER PIPE. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT/ BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI P10-4

Client FRENCH LTD. TASK GROUP
Project Name French Ltd. 1986 F.I.
Project Location Crosby, Texas
Job No. 275-14 Boring No. P10-4
Logged By S. L. Baird
Approved By
Drilled By GCC

DRILLING AND SAMPLING INFORMATION
Date Started 7/31/86 Date Completed 8/1/86
Method MR Total Depth 82.2 FEET

WELL COMPLETION INFORMATION
Screen Dia. 2" Length 2.0
Slot Size 0.010" Type PVC
Casing Dia. 2" & 6" Length 81.2

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
0	SURFACE ELEVATION 13.70							
20	BORING ADVANCED TO 60' BEFORE TAKING SAMPLES	-46.3						
60	SILTY CLAY, brown, gray and yellow horizontal bands with gray silt partings	-51.8	1	ST	80			
			2	ST	75			
	SILTY SAND, brown	-53.3	3	ST	80			
	SILTY CLAY, blue with brown mottles, very stiff	-55.1	4	ST	65			
70	VERY CLAYEY SILT, brown, blue, soft	-57.1	5	ST	70			
	CALCAREOUS NODULES, white with 20% blue silty clay	-60.1	6	ST	45			
			7	ST	60			
	SANDY SILT, blue, brown, damp and loose	-62.1	8	ST	50			
	SILTY SAND, brown, some gray mottles, wet	-63.5	9	ST	55			
80	SLIGHTLY SILTY CLAY, red	-69.1	10	ST	80			
			11	ST	80			

TD 82.2. SIX INCH CASING SET TO 80.0'. TWO INCH, 0.010" SLOT SCREEN SET WITH CAP ON BOTTOM. FLUSH JOINTED TRILOC PVC RISER PIPE. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 11

Client	FRENCH LTD. TASK GROUP
Project Name	French Ltd. 1986 F.I.
Project Location	Crosby, Texas
Job No.	275-14
Boring No.	11
Logged By	S. L. Baird
Approved By	
Drilled By	SWL

DRILLING AND SAMPLING INFORMATION

Date Started	7/17/86	Date Completed	7/31/86
Method	MR	Total Depth	152.5 FEET

WELL COMPLETION INFORMATION

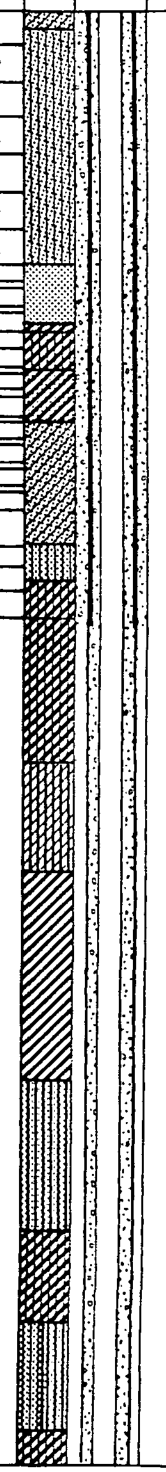
Screen Dia.	4"	Length	16.56
Slot Size	0.010"	Type	PVC
Casing Dia.	4" & 8"	Length	137.81

SURFACE ELEVATION 9.90

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET
0	CLAYEY SAND, dark gray	
	SILTY SAND, brown to dark gray, medium to coarse grained, saturated, some gravels and pebbles	
20	SAND, white, coarse to medium, angular to subrounded, multicolored gravels, odor	
	SANDY CLAY, gray	
	SILTY CLAY, tan, odor	
30	SANDY CLAY, gray, damp, odor	
	CLAYEY SAND, tan, damp	
	SILTY SAND, gray and red, medium to fine grained, saturated	
	SLIGHTLY SILTY CLAY, reddish brown, gray veining, blocky texture	
50	SLIGHTLY SILTY CLAY EIGHT INCH SURFACE CASING SET TO 50.5	
60	CLAYEY SILT, many calcareous nodules, some sand seams	
70	CLAY, less than 10% silt	
90	SANDY SILT	
100	SILTY CLAY	
110	SILTY SAND/SANDY SILT	
120	SILTY CLAY	

SAMPLE NO.	SAMPLE TYPE	% RECOVERY
1	ST	47
2	ST	40
3	ST	37
4	ST	NR
5	ST	27
6	ST	10
7	ST	NR
8	SS	73
9	SS	73
10	SS	100
11	SS	100
12	SS	73
13	SS	73
14	SS	73
15	SS	73
16	SS	93
17	SS	80
18	ST	67
19	ST	93
20	ST	67
21	ST	78

GRAPHIC LOG / WELL COMPLETION / WATER LEVEL



SAMPLER TYPE

SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD

HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

RESOURCE ENGINEERING

Client FRENCH LTD. TASK GROUP
Project Name French Ltd. 1986 F.I.
Project Location Crosby, Texas
Job No. 275-14 Boring No. 11

CONTINUATION OF REI-11

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
120								
130								
	SILTY SAND/SANDY SILT							
140								
150	SANDY SILT, dark green, damp		27	SS	87			
	SILTY CLAY, grayish green with red mottles							
155	T.D. 155.0 BORING (3 5/8") ADVANCED TO 155; SAMPLE PUSHED 155-156.5: BORING (7 5/8") OVERREAMED TO 152.5. FOUR INCH FLUSH JOINTED PVC SET TO 152.5 AND FOUR INCH 0.010" SLOT SCREEN WITH FLUSH VALVE. #3 SAND USED IN SAND PACK, 75 GALLONS OF BENTONITE GEL TRIMMED 120-134'. BORING CAPPED 3 HOURS LATER WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. TOP OF CASING ELEVATION SURVEYED.		28	SS	55			

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 12-1

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: 12-1
Logged By: S. L. Baird
Approved By:
Drilled By: SWL

DRILLING AND SAMPLING INFORMATION
Date Started: 7/24/86 Date Completed: 8/2/86
Method: MR Total Depth: 151.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 36.50
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" & 8" Length: 116.52

DEPTH IN FEET | DESCRIPTION | STRATUM ELEVATION IN FEET | SAMPLE NO. | SAMPLE TYPE | % RECOVERY | GRAPHIC LOG | WELL COMPLETION | WATER LEVEL

SURFACE ELEVATION 10.50

SAND, medium to fine grained, angular, wet

CLAYEY SILT/SILTY CLAY

CLAYEY SAND

SILTY CLAY

CLAYEY SILT/SANDY SILT, red

EIGHT INCH CASING SET TO 33.35

CLAYEY SAND, white, damp

CLAYEY SAND, white to tan, damp

SANDY CLAY, tan

SLIGHTLY SILTY CLAY, multicolored red, brown, green and blue, firm to very stiff, calcareous nodules and specks

CLAY, red, stiff, occasional calcareous specks

SANDY SILT, medium gray with yellowish brown sand lenses

PEAT/SILTY CLAY, dark gray, interbedded

SILTY CLAY, bluish gray

SANDY SILT, bluish gray

SILTY CLAY/CLAYEY SILT, grayish green

SILTY SAND, gray and green, fine grained, damp, 20% fines

SAMPLE NO.	SAMPLE TYPE	% RECOVERY
1	SS	75
2	ST	30
3	ST	85
4	ST	80
5	ST	50
6	ST	45
7	ST	60
8	ST	45
9	ST	95
10	ST	70
11	SS	NR
12	SS	100
13	SS	80
14	SS	100
15	SS	100
16	SS	NR

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON
ST - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

RESOURCE ENGINEERING

Client FRENCH LTD. TASK GROUP
Project Name French Ltd. 1986 F.I.
Project Location Crosby, Texas
Job No. 275-14 Boring No. 12-1

CONTINUATION OF REI 12-1

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
120			17	SS	27			
130	saturated, less than 5% fines		18	SS	40			
			19	SS	27			
140			20	SS	60			
	VERY SANDY SILT, dark olive		21	SS	NR			
			22	SS	67			
150	SILTY CLAY, grayish green with red							
	T.D. 153.5. BORING (3 5/8") ADVANCED TO 153.5; SAMPLE PUSHED 153.5-155. BORING (7 5/8") OVERREAMED TO 151.0 FOUR INCH FLUSH JOINTED PVC SET, FOUR INCH 0.010" SLOT SCREEN WITH FLUSH VALVE. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS USED IN SEAL, CAPPED WITH CEMENT/BENTONITE SLURRY. STAINLESS STEEL CENTRALIZERS @ 110', 80' and 40'. WELL CAPPED AND VENTED. TOP OF CASING ELEVATION SURVEYED.		23	SS	80			

RESOURCE ENGINEERING
SUBSURFACE EXPLORATION

LITHOLOGIC LOG AND CONSTRUCTION OF REI 12-2

Client: FRENCH LTD. TASK GROUP
Project Name: French Ltd. 1986 F.I.
Project Location: Crosby, Texas
Job No.: 275-14 Boring No.: 12-2
Logged By: S. L. Baird
Approved By:
Drilled By: SWL

DRILLING AND SAMPLING INFORMATION
Date Started: 7/29/86 Date Completed: 7/29/86
Method: MR Total Depth: 50.0 FEET

WELL COMPLETION INFORMATION
Screen Dia.: 4" Length: 15.17
Slot Size: 0.010" Type: PVC
Casing Dia.: 4" Length: 36.69

DEPTH IN FEET	DESCRIPTION	STRATUM ELEVATION IN FEET	SAMPLE NO.	SAMPLE TYPE	% RECOVERY	GRAPHIC LOG	WELL COMPLETION	WATER LEVEL
	SURFACE ELEVATION 10.40							
0	SURFACE FILL, SAND, RAILROAD TIES							
	SILTY SAND/SAND							
10								
20	SILTY CLAY							
30	SILTY SAND							
	VERY SANDY CLAY, red		1	SS	93			
	SILTY SAND, red and gray		2	SS	65			
40			3	SS	37			
			4	SS	50			
			5	SS	67			
			6	SS	87			
	CLAYEY SAND, grayish blue		7	SS	100			
50	SILTY CLAY, gray		8	SS	100			

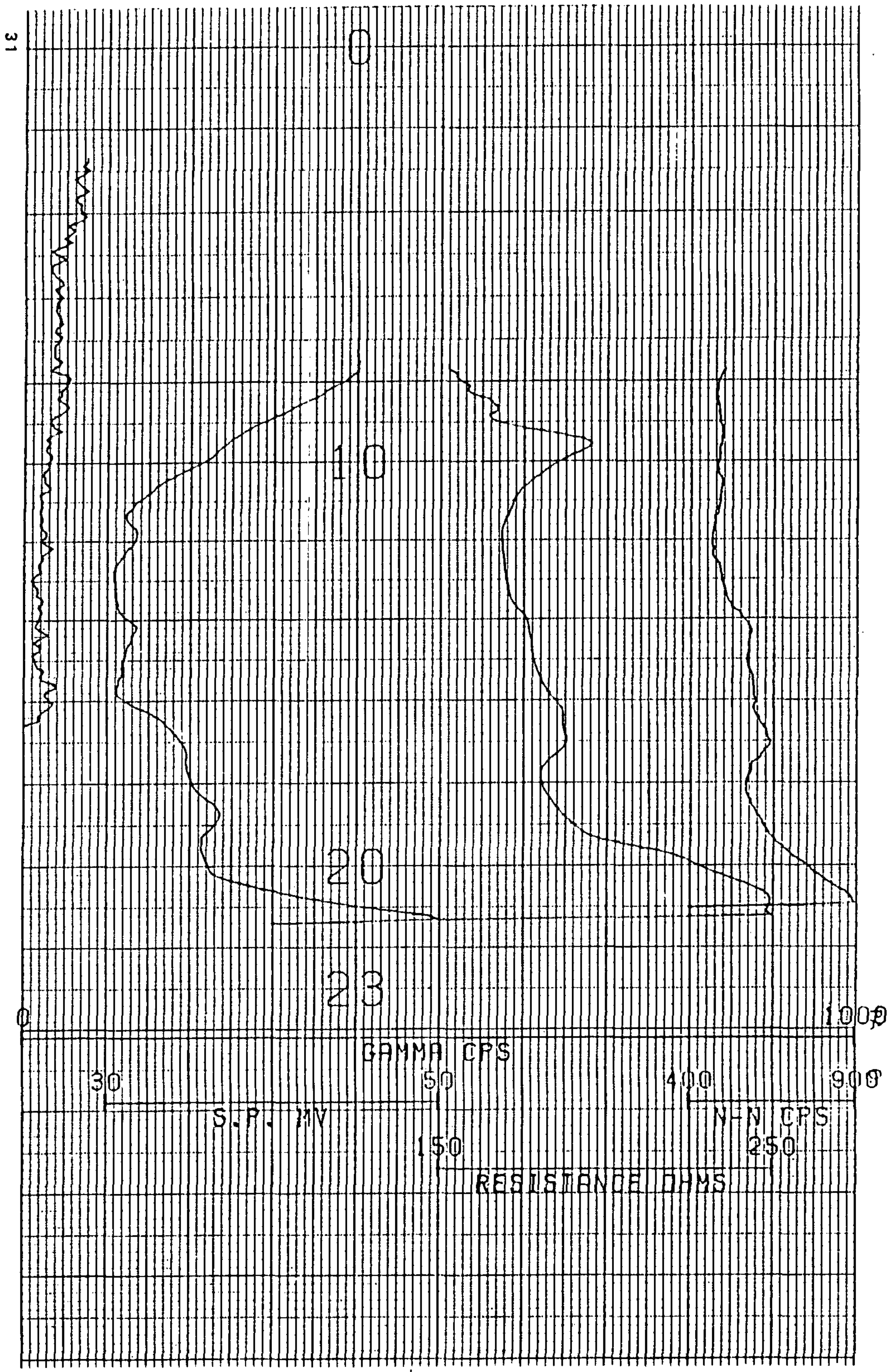
T.D. 50.5. BORING (3 7/8") ADVANCED TO 49, SAMPLE PUSHED 49-50.5. BORING (8") OVERREAMED TO 50. FOUR INCH MONITOR WELL SET WITH FLUSH VALVE, 4" SCH 40 PVC FLUSH JOINTED CASING AND 0.010" SLOT SCREEN. #3 SAND USED IN SAND PACK, 1/2" BENTONITE PELLETS IN SEAL. GROUTED WITH CEMENT/BENTONITE SLURRY. WELL CAPPED AND VENTED. ELEVATION OF TOP OF CASING SURVEYED.

SAMPLER TYPE
SS - DRIVEN SPLIT SPOON CA - CONTINUOUS FLIGHT AUGER
ST - PRESSED SHELBY TUBE RC - ROCK CORE

BORING METHOD
HSA - HOLLOW STEM AUGERS DC - DRIVING CASING
CFA - CONTINUOUS FLIGHT AUGERS MD - MUD DRILLING

Appendix 13

Monitor Well and Piezometer Geophysical (E-Logs) Logs



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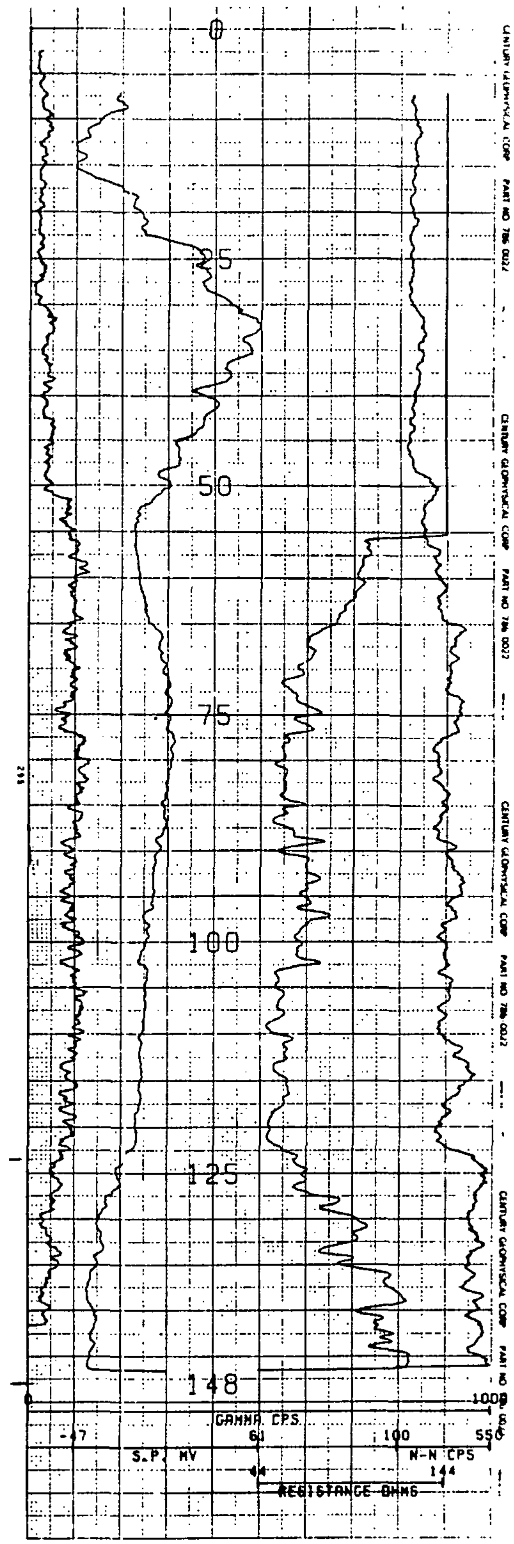
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG
REI 3-5
FRENCH LIMITED

DRAWN BY:	DATE: 11-22-86	PROJECT NO. 275-14



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GEOPHYSICAL LOG
REI 10-1
FRENCH LIMITED

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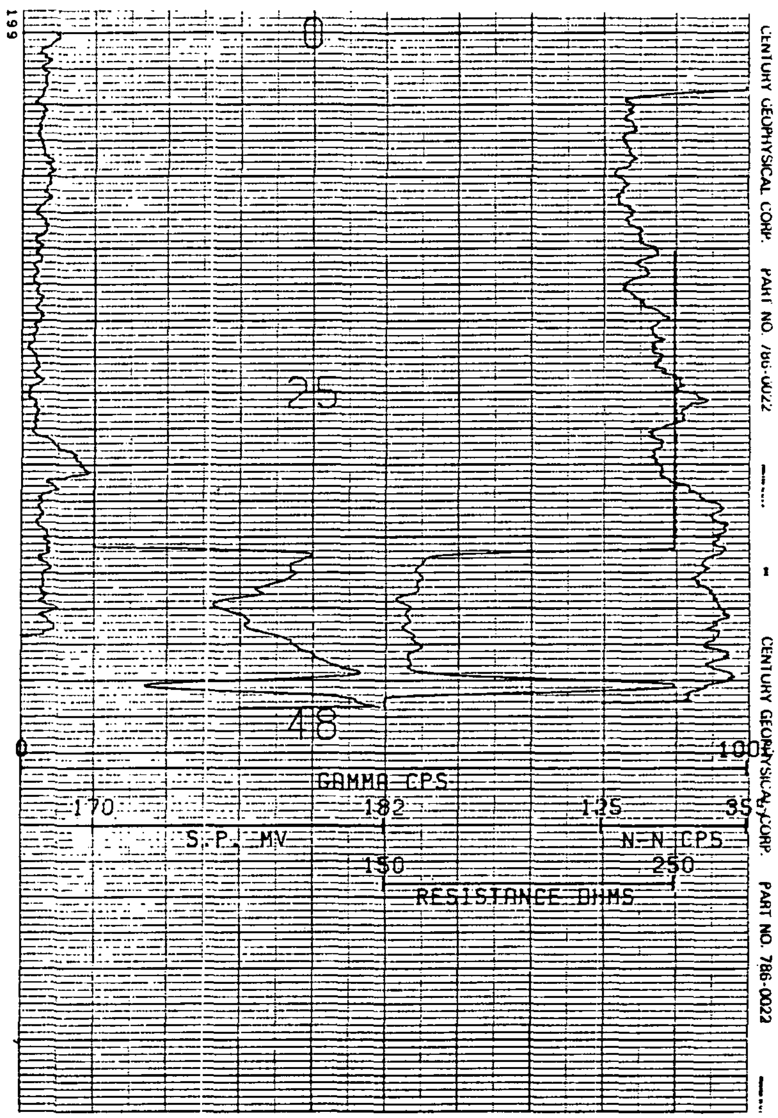

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HOUSTON, TEXAS

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FRENCH LIMITED

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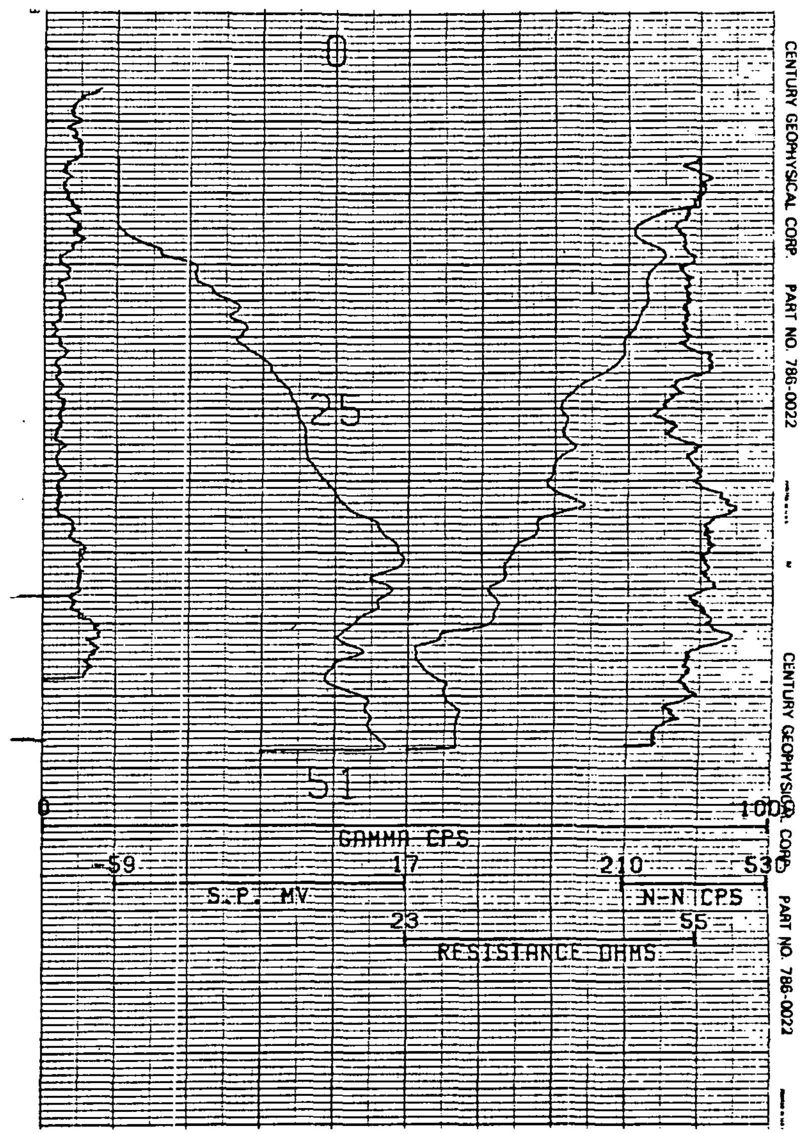

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

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REI 10-3
FRENCH LIMITED

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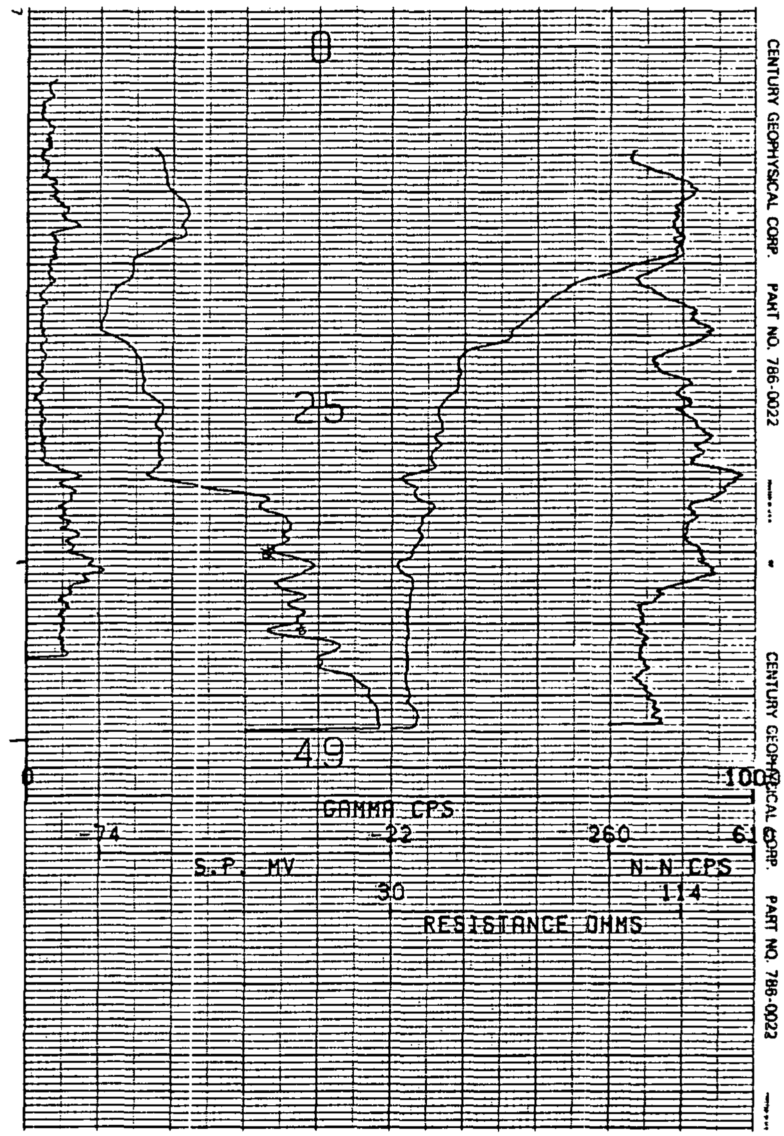

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

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REI 10-4
FRENCH LIMITED

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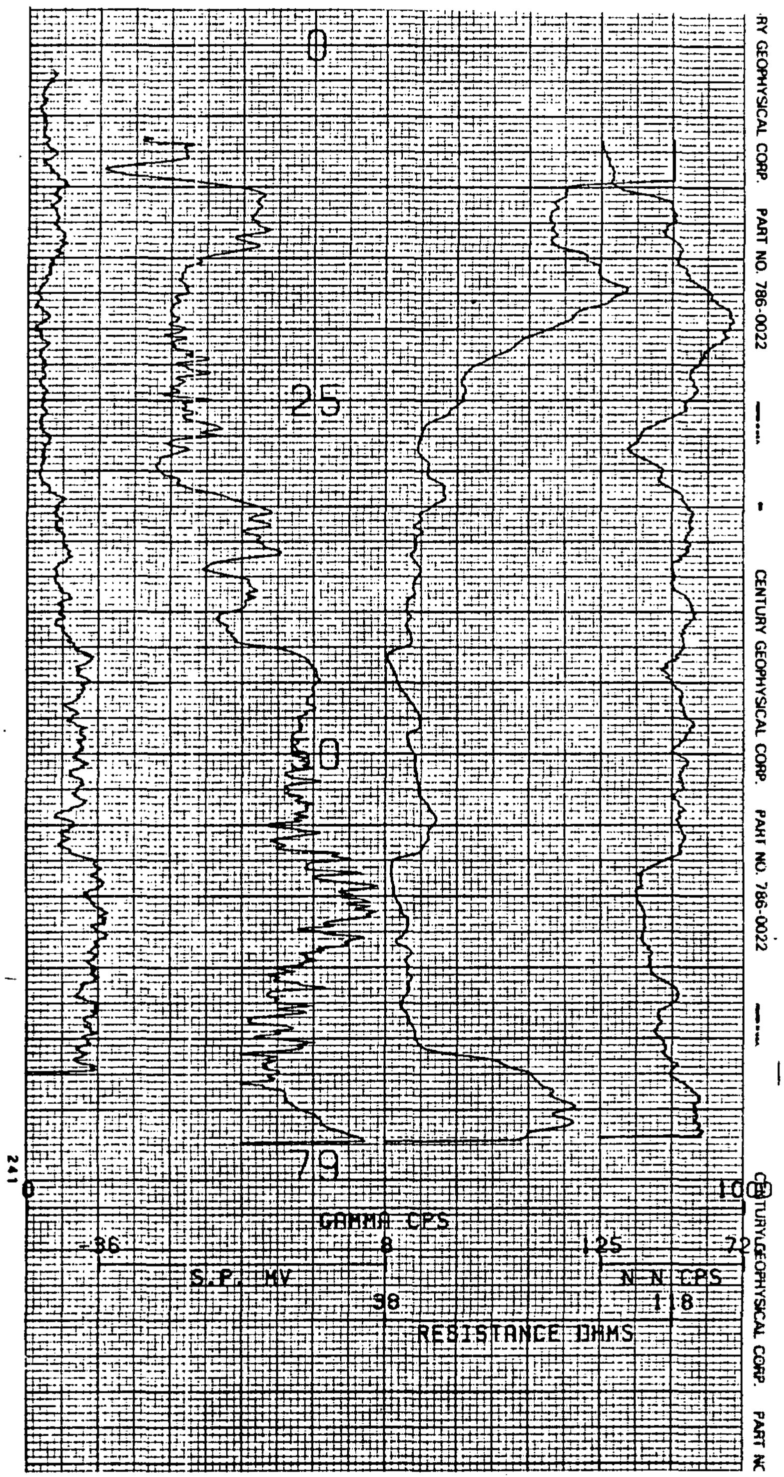

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GEOPHYSICAL LOG
REI P10-3
FRENCH LIMITED

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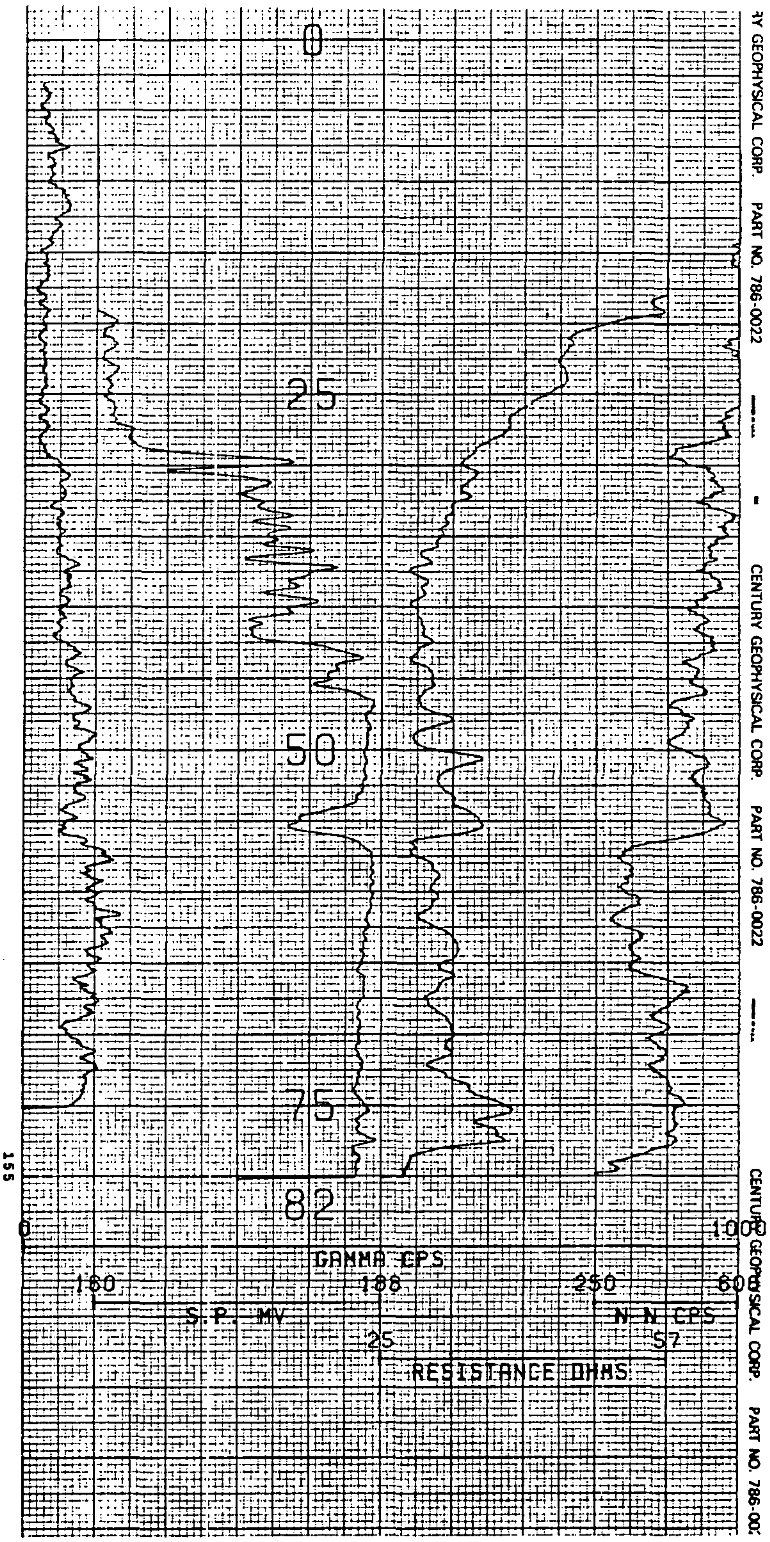

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REI P10-4
FRENCH LIMITED

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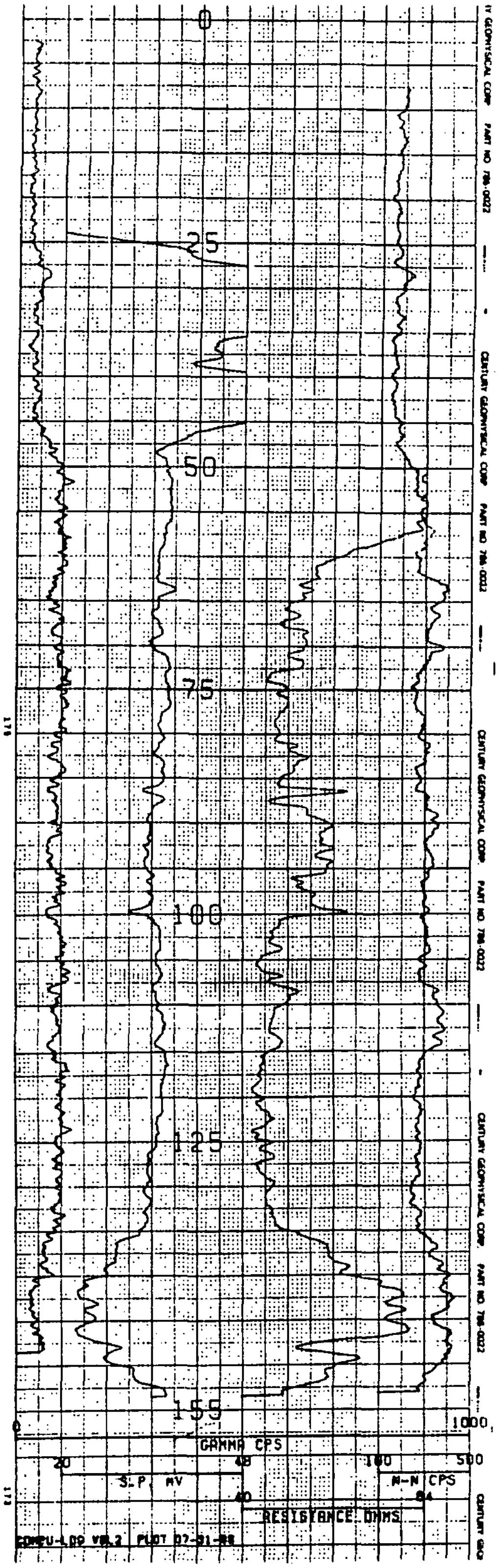

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ENVIRONMENTAL CONSULTANTS

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GEOPHYSICAL LOG
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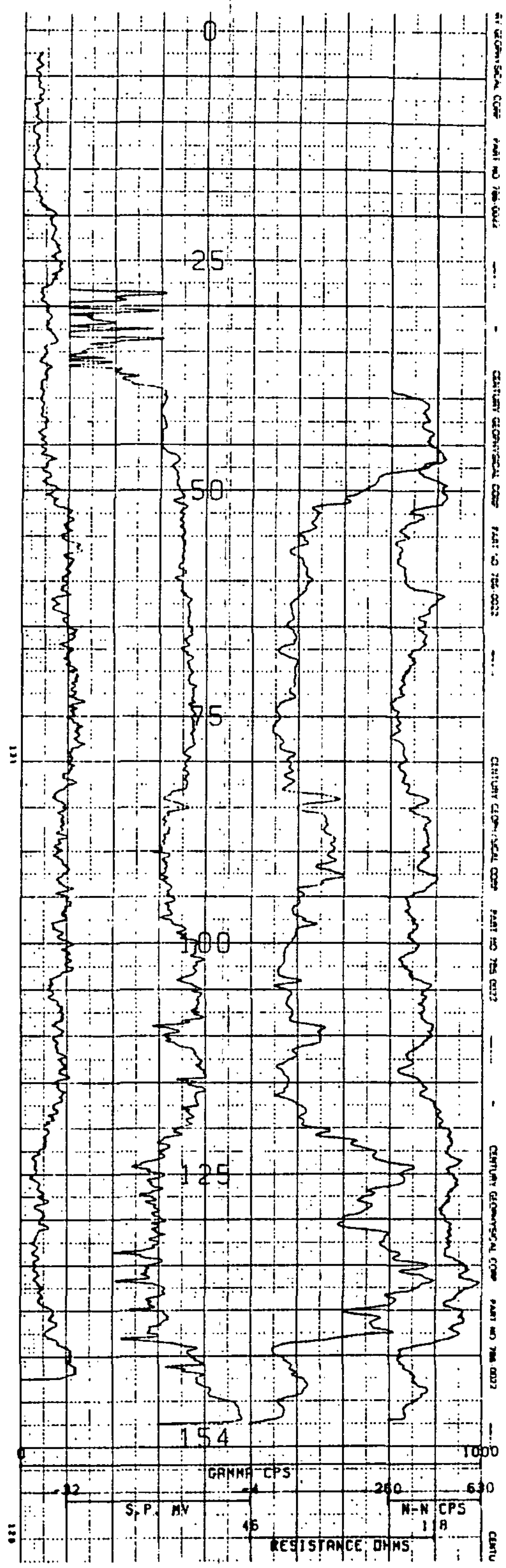

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GEOPHYSICAL LOG
REI 12-1
FRENCH LIMITED

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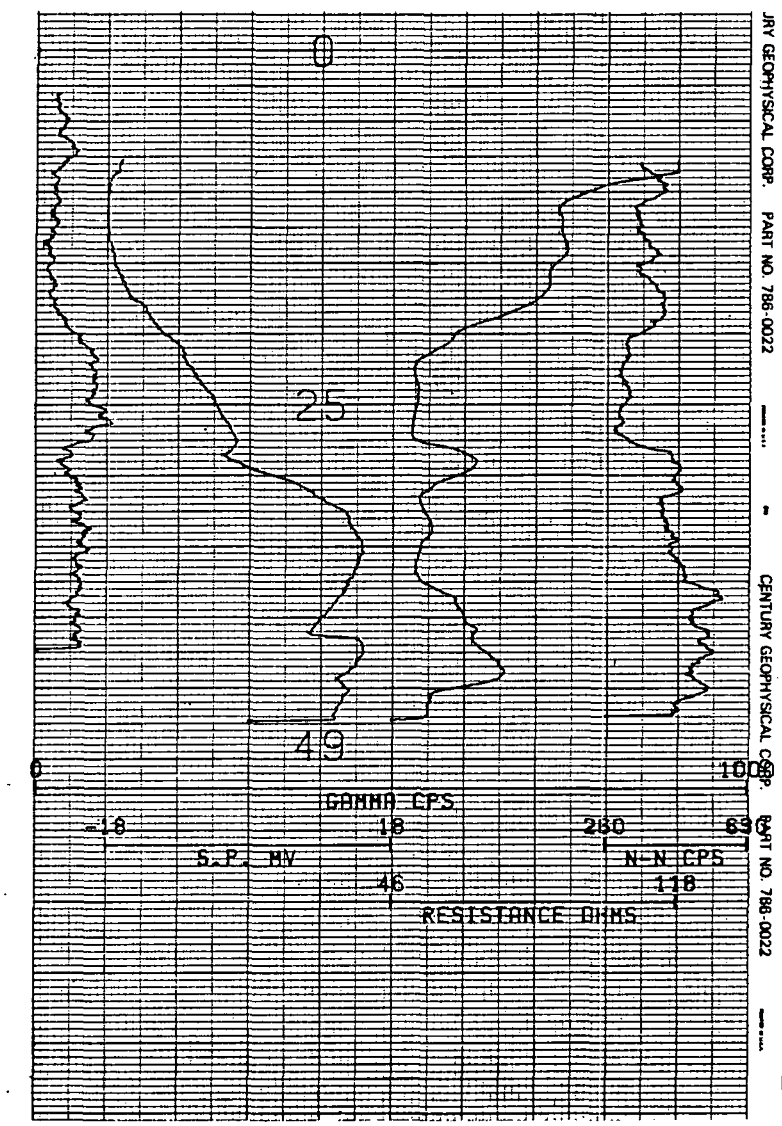

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GEOPHYSICAL LOG
REI 12-2
FRENCH LIMITED

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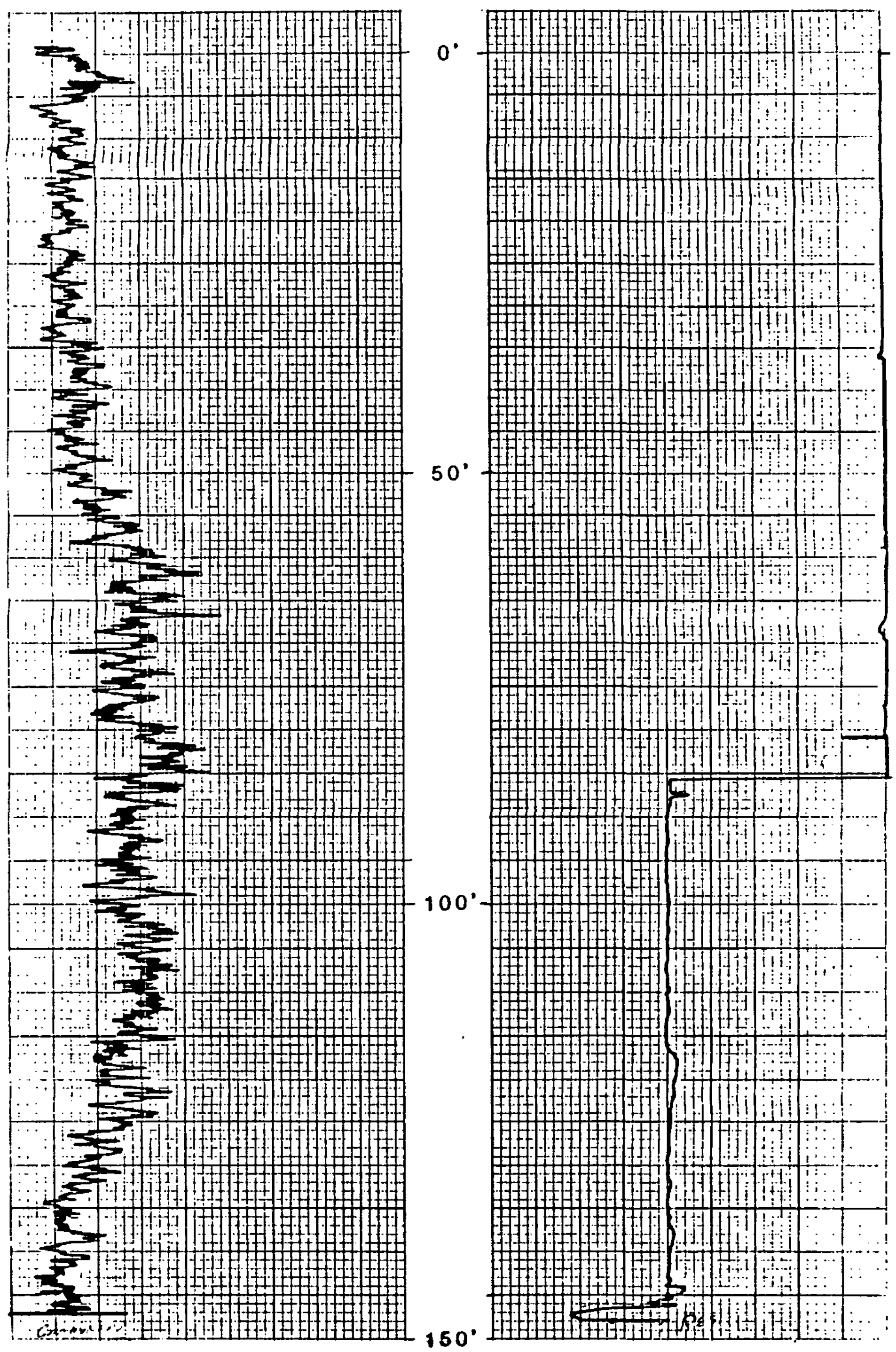

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ENVIRONMENTAL CONSULTANTS

HOUSTON, TEXAS

GEOPHYSICAL LOG
GW-25
FRENCH LIMITED

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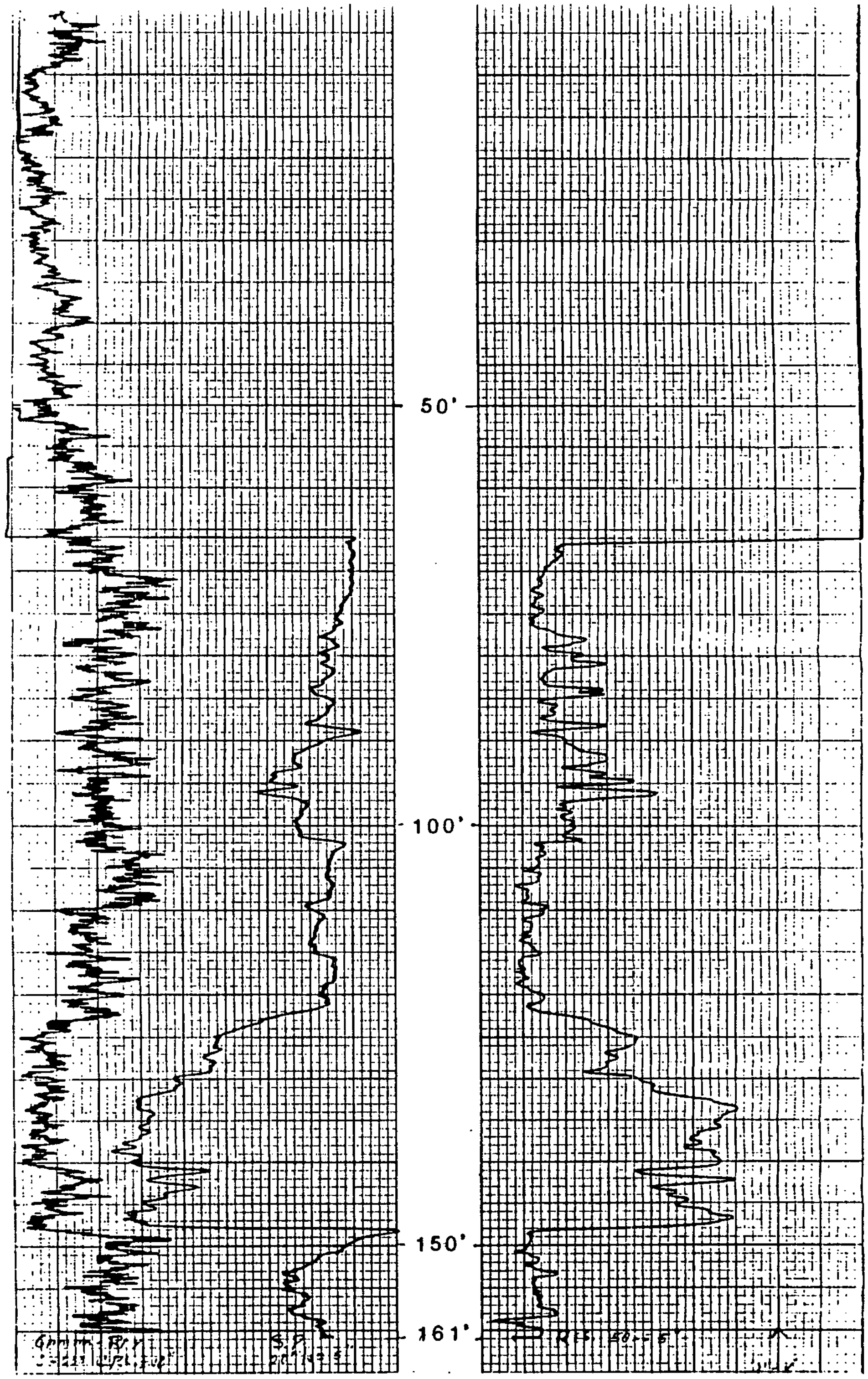
L.C.S.	12/12/86	275-14



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GEOPHYSICAL LOG

REI 3-4

FRENCH LIMITED

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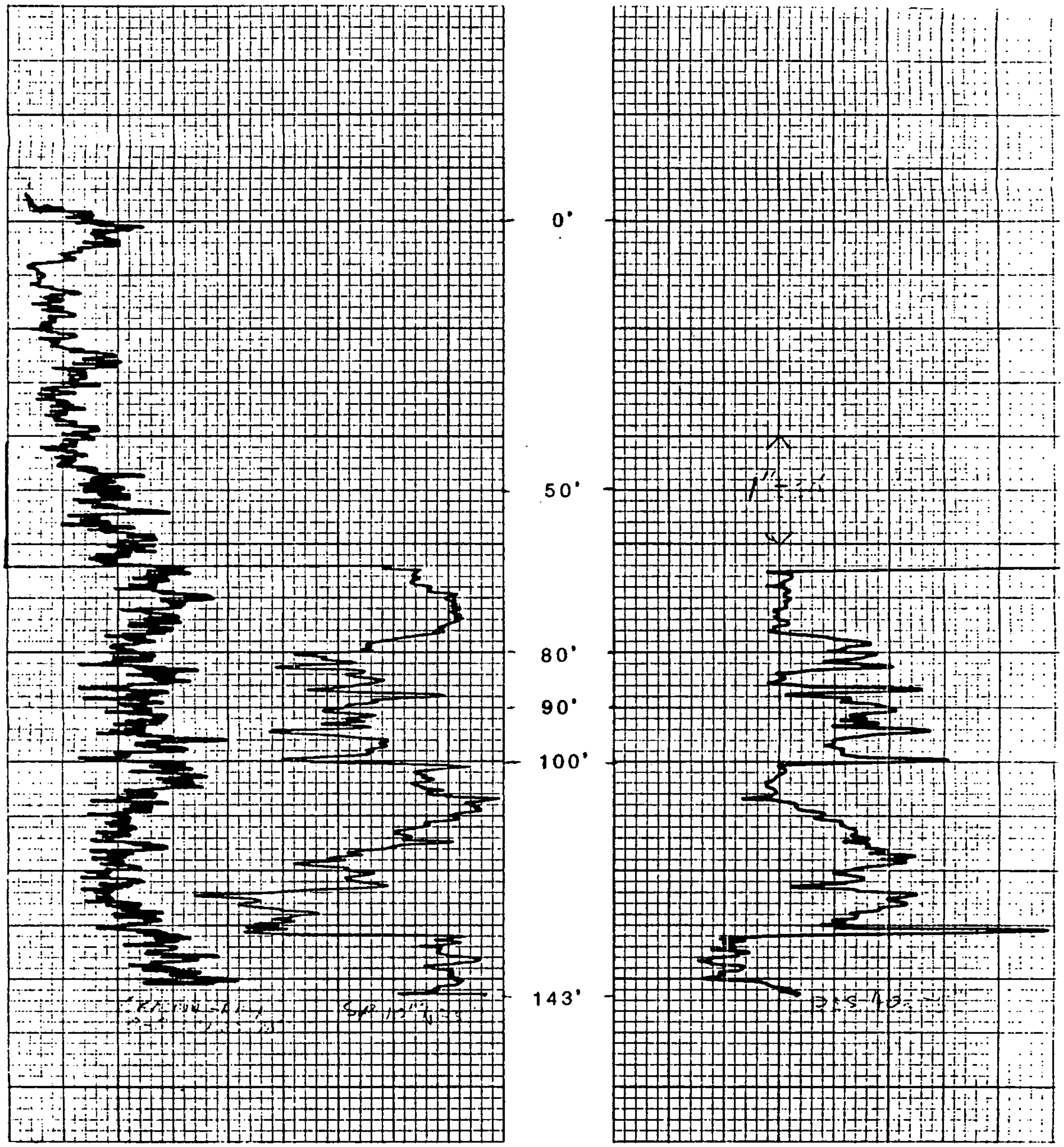

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

GEOPHYSICAL LOG
REI-7
FRENCH LIMITED

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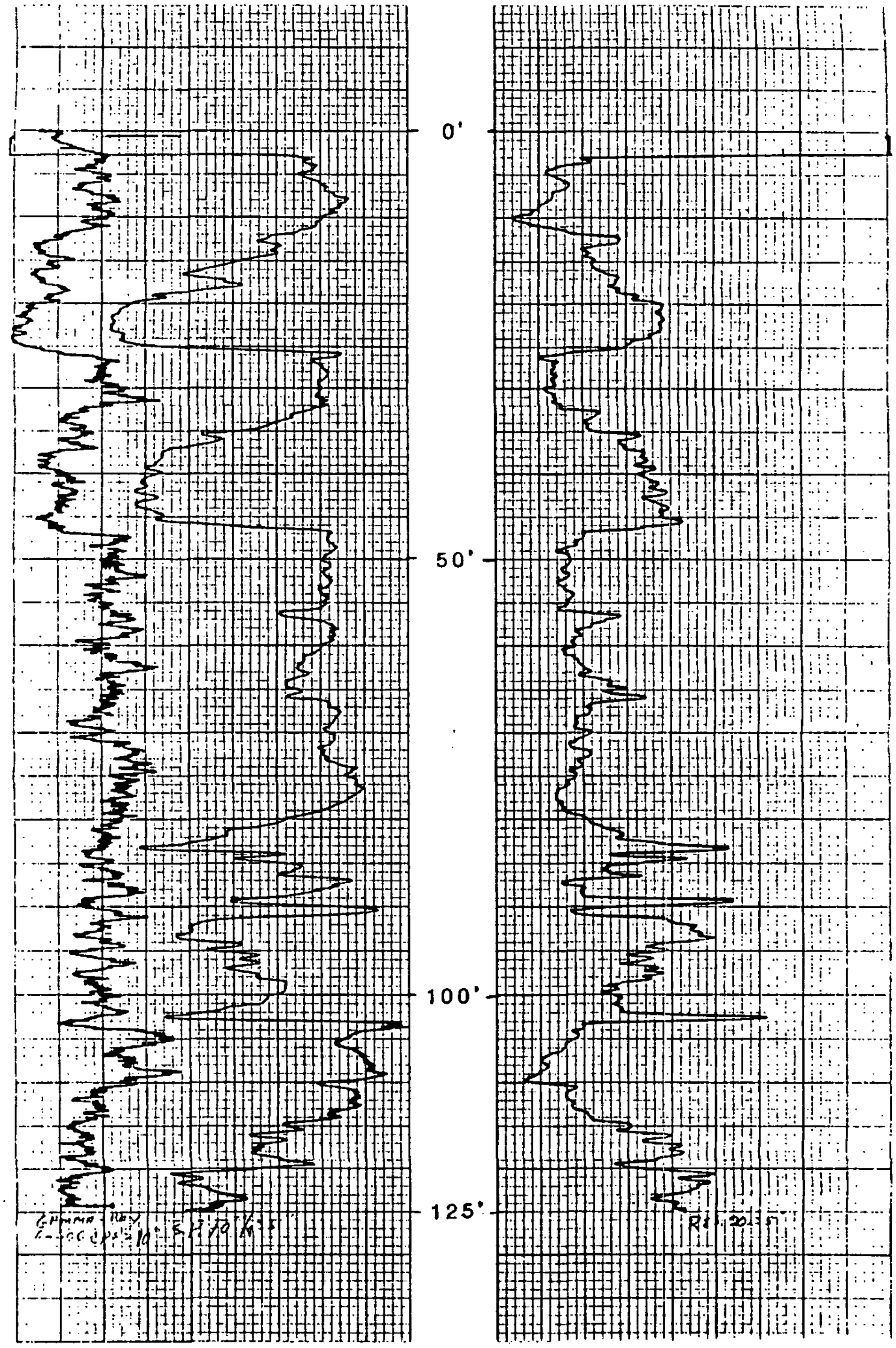

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

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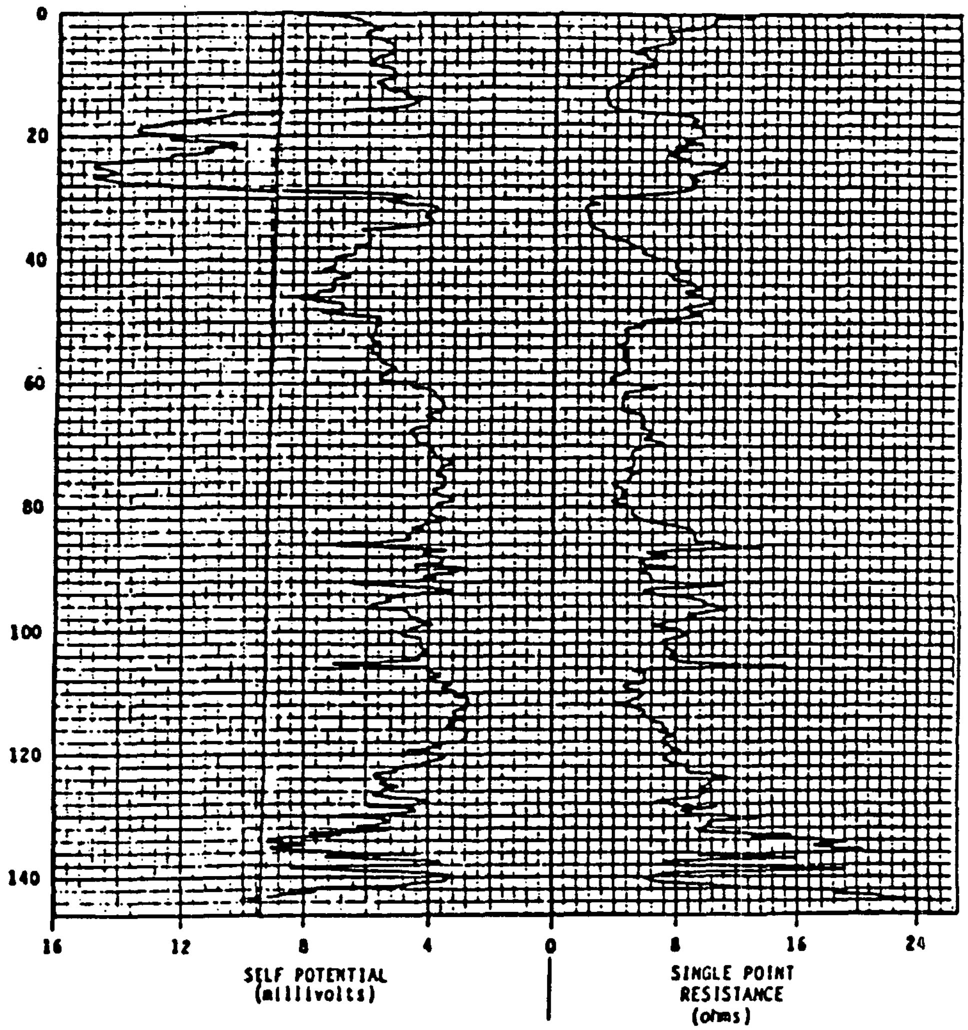

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GEOPHYSICAL LOG

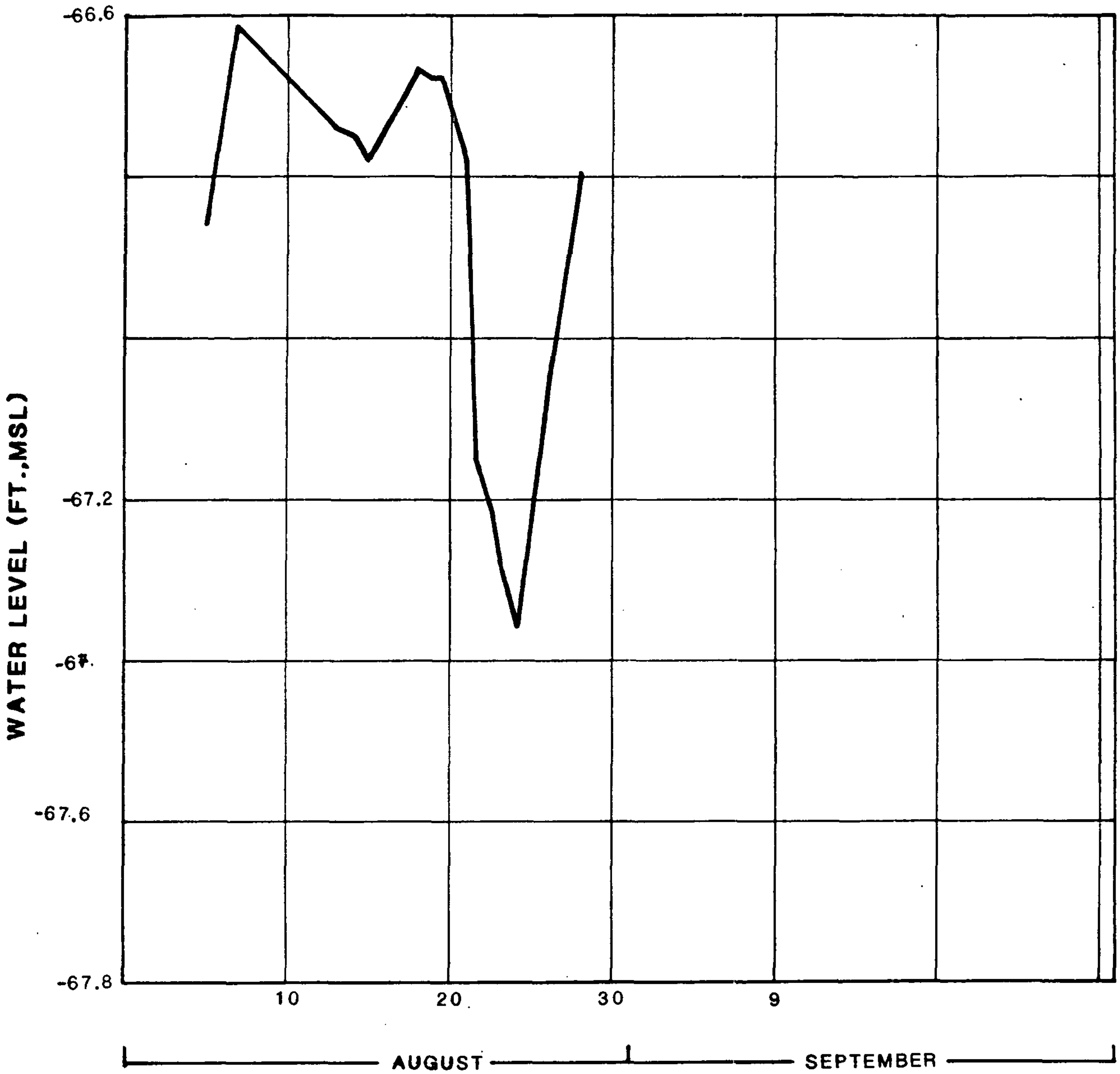
GW-06

FRENCH LIMITED

DRAWN BY:	DATE:	PROJECT NO.
L.C.S.	12/12/86	275-14

Appendix 14

Monitor Well and Piezometer Geophysical (E-Logs) Logs



NOTE: SCALE DIFFERS FROM OTHER HYDROGRAPHS

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

HYDROGRAPH
REI 10-1
FRENCH LIMITED

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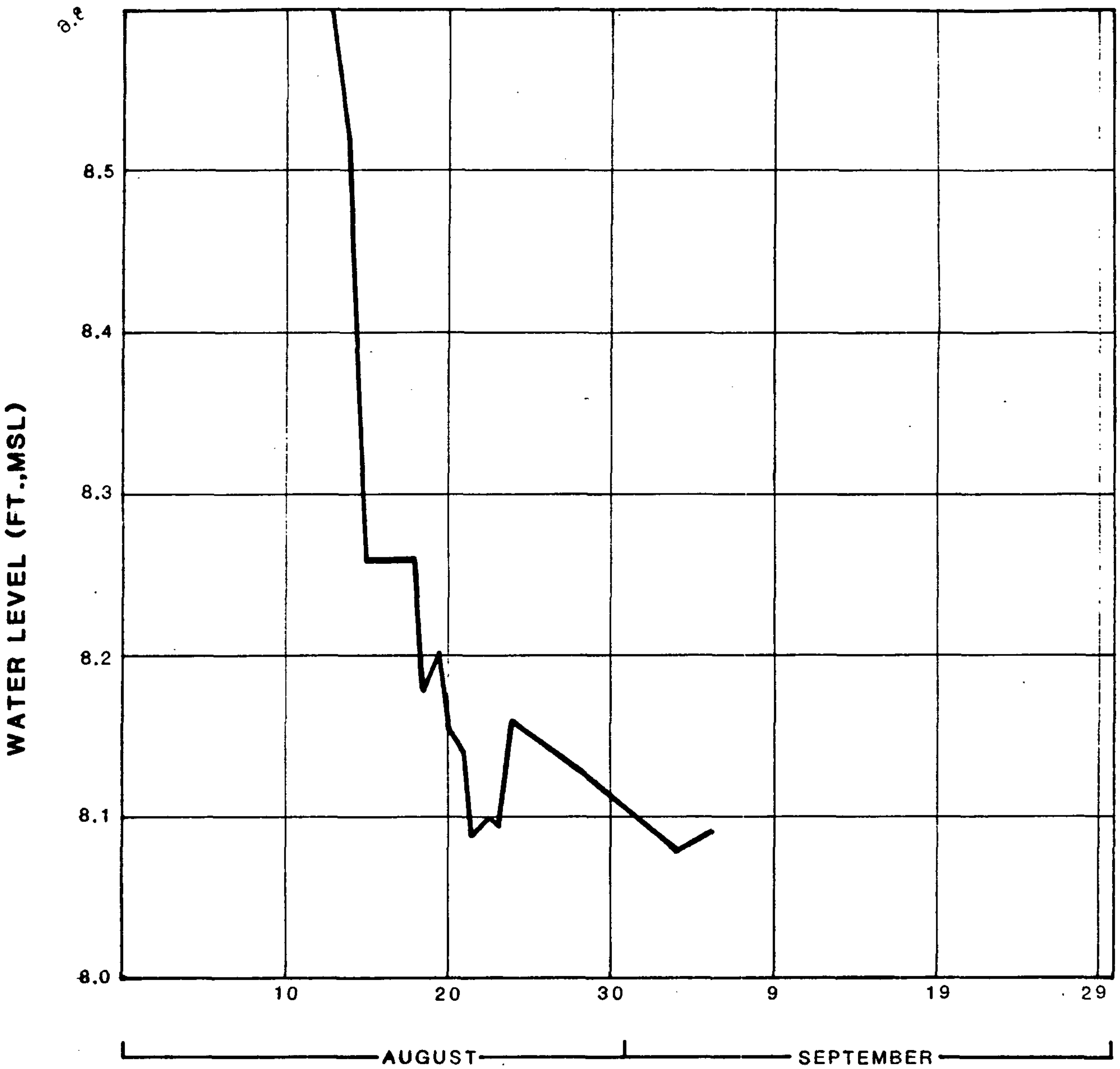

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

HYDROGRAPH
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FRENCH LIMITED

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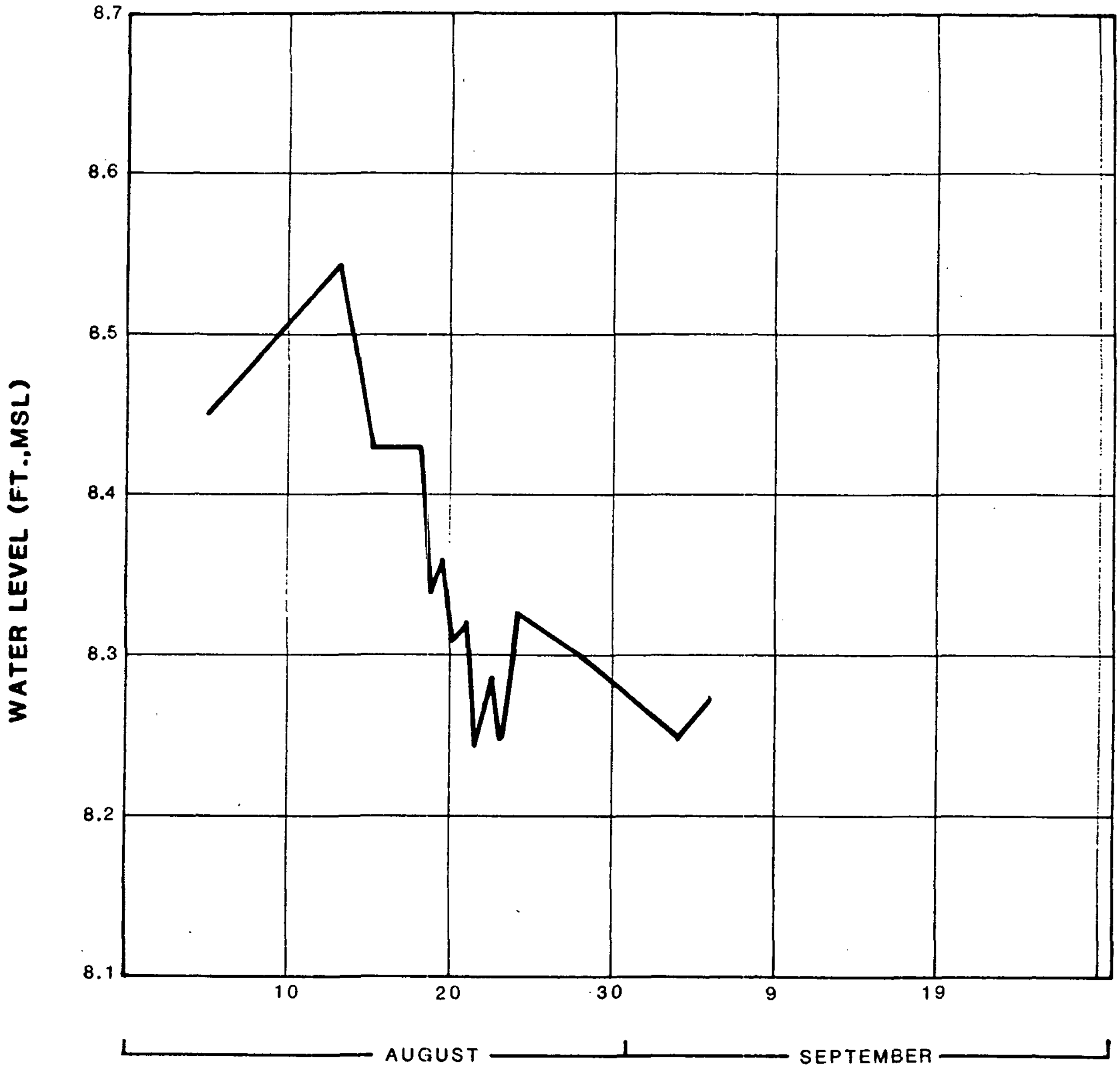

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HYDROGRAPH
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FRENCH LIMITED

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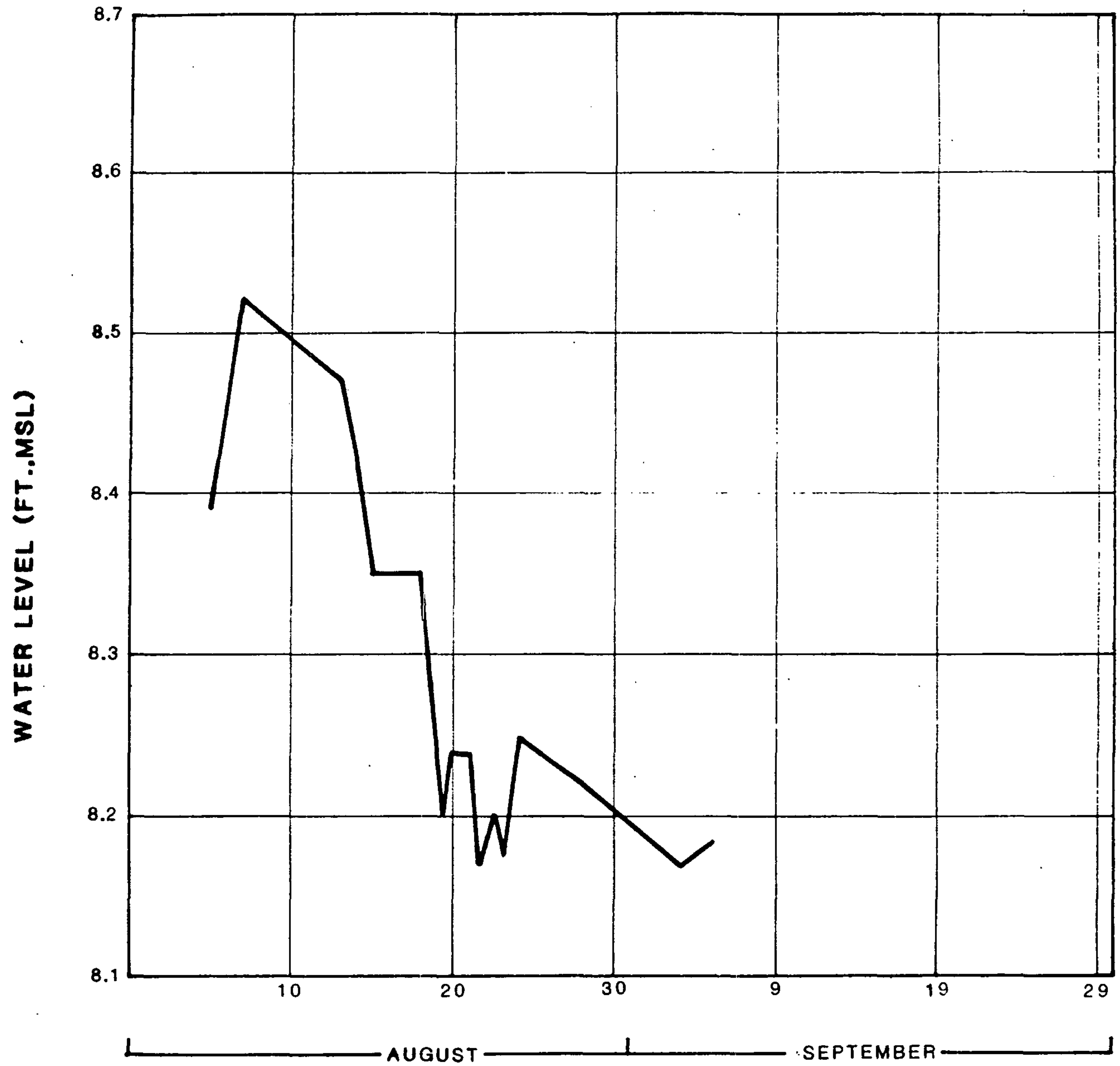

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HYDROGRAPH
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FRENCH LIMITED

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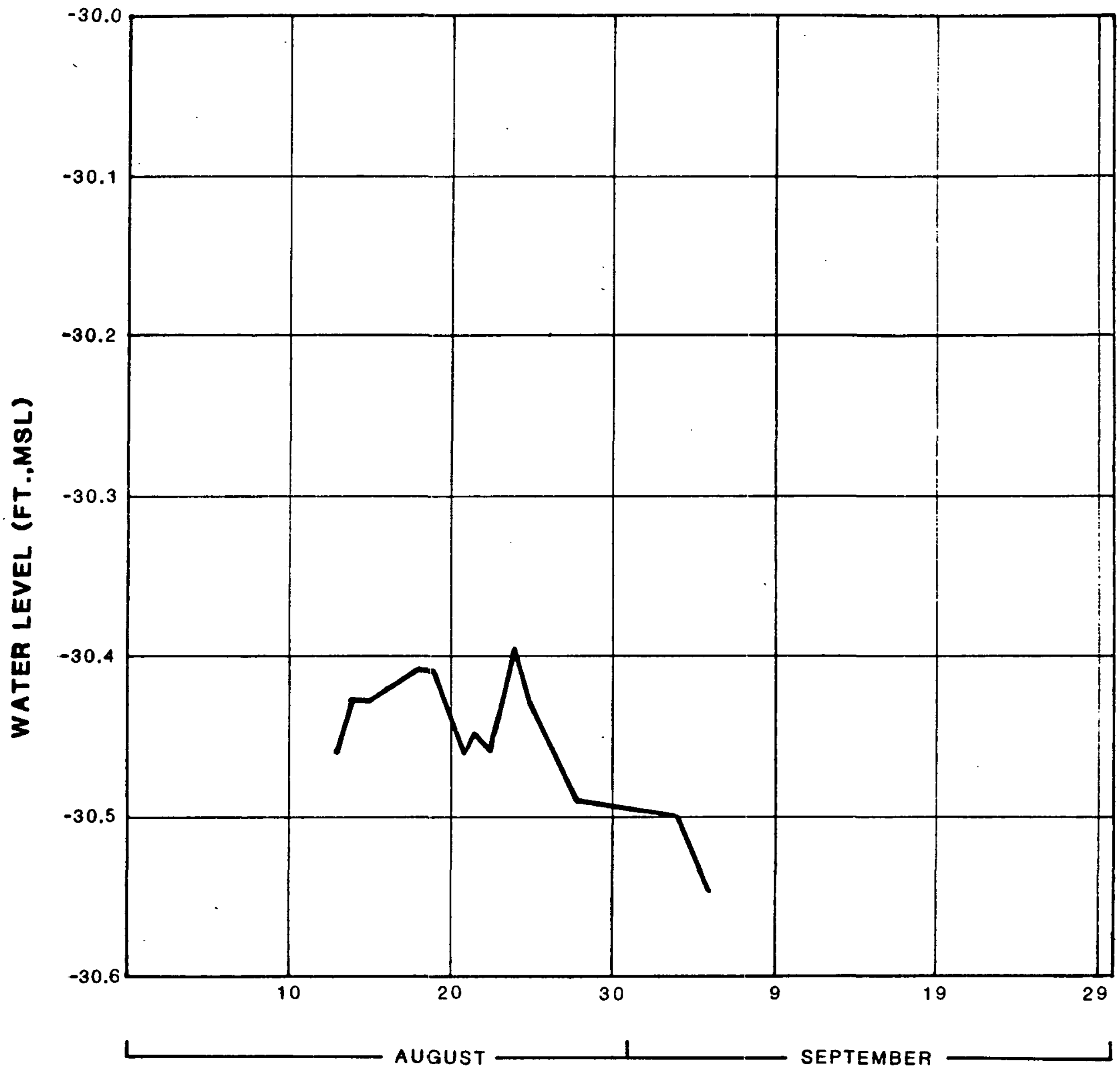

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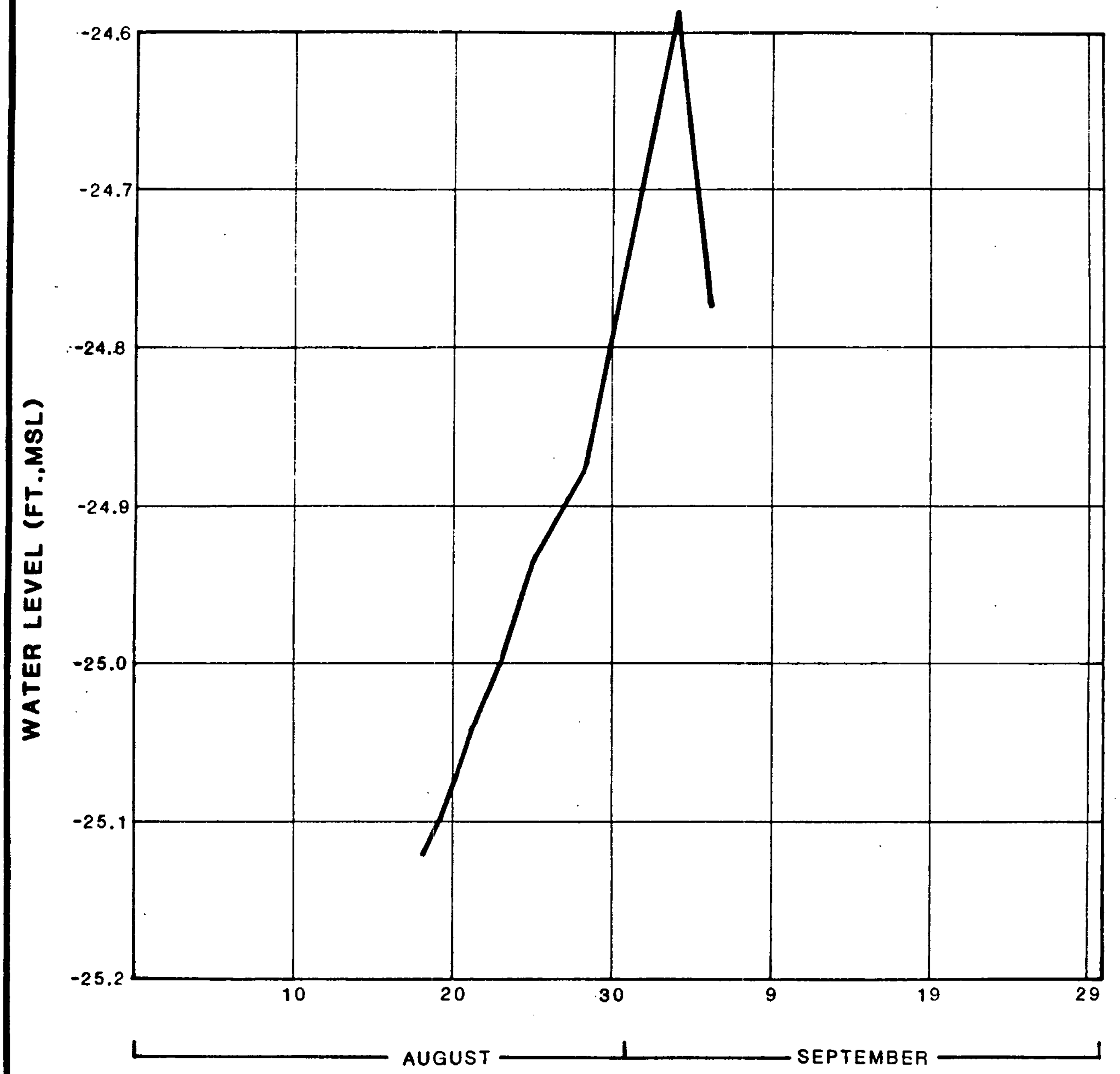
FIGURE
HYDROGRAPH
P 10-2 (SILT SUBCLAY)
FRENCH LIMITED

DRAWN BY:	DATE: 9-15-86	PROJECT NO. 275-14



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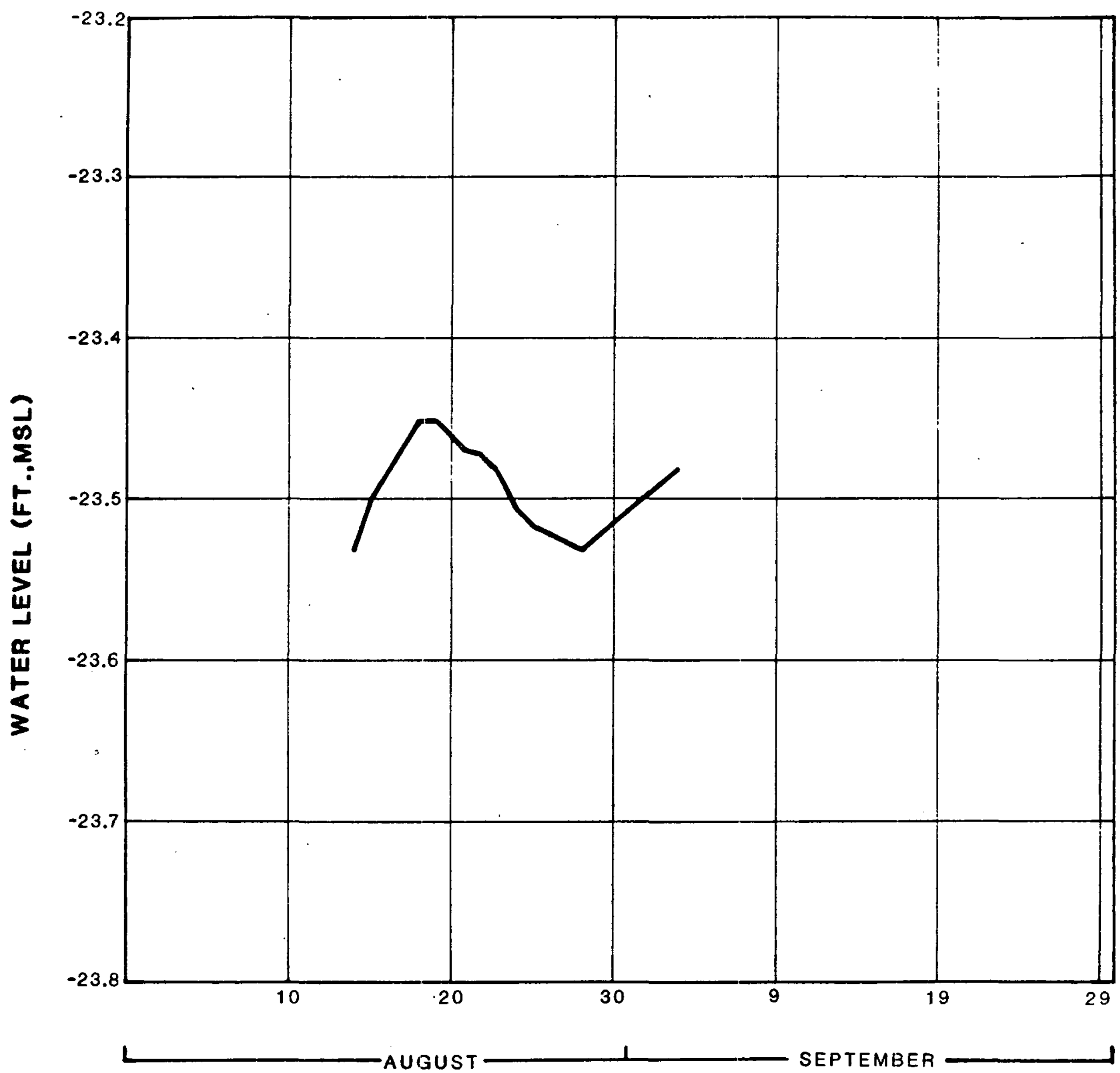
HYDROGRAPH

P 10-3 (DEEP CLAY)

FRENCH LIMITED

DRAWN BY:	DATE: 9-15-86	PROJECT NO. 275-14



-67.0

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HYDROGRAPH
P 10-4 (SHALLOW CLAY)
FRENCH LIMITED

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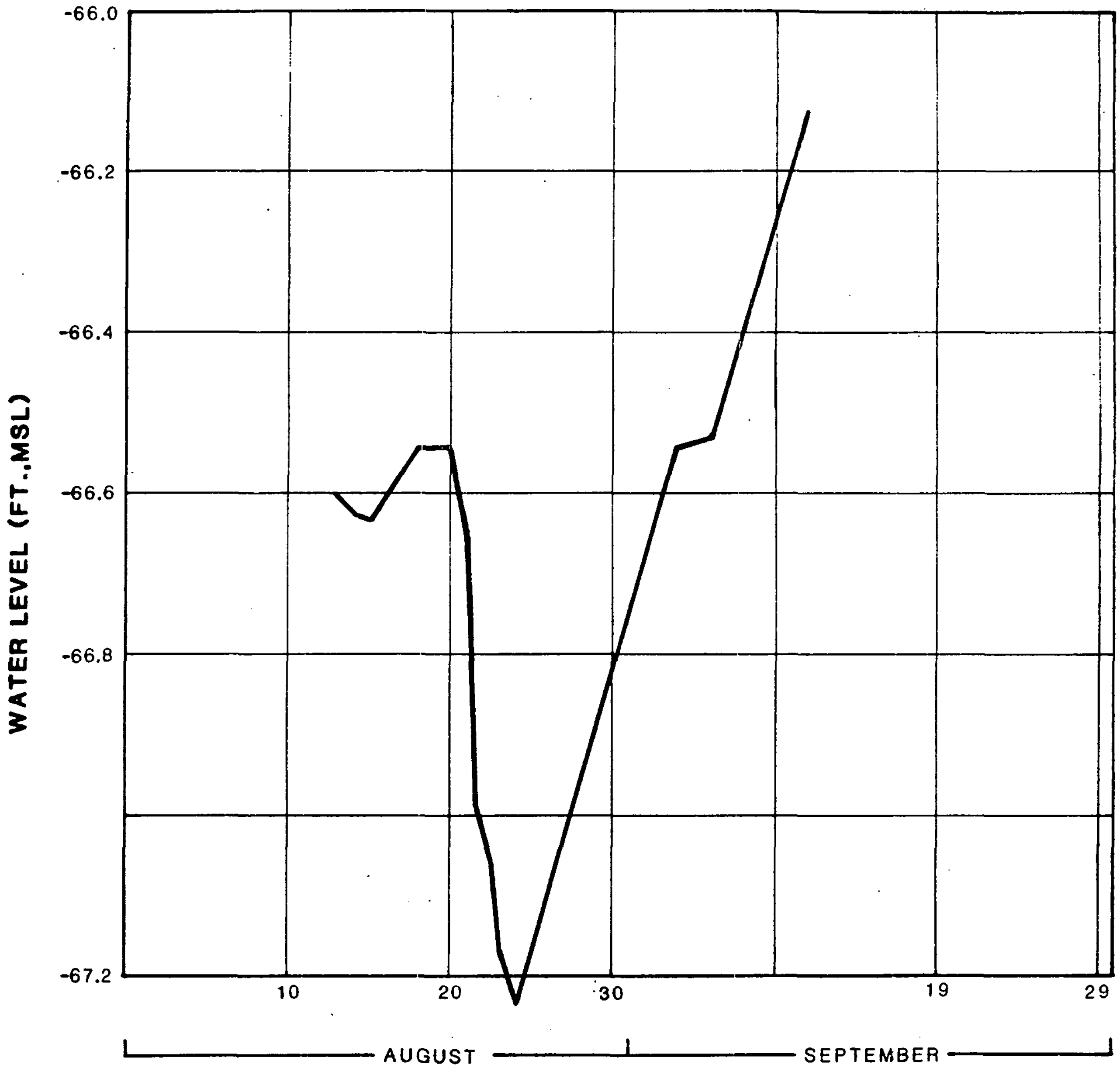

NOTE: SCALE DIFFERS FROM OTHER HYDROGRAPHS

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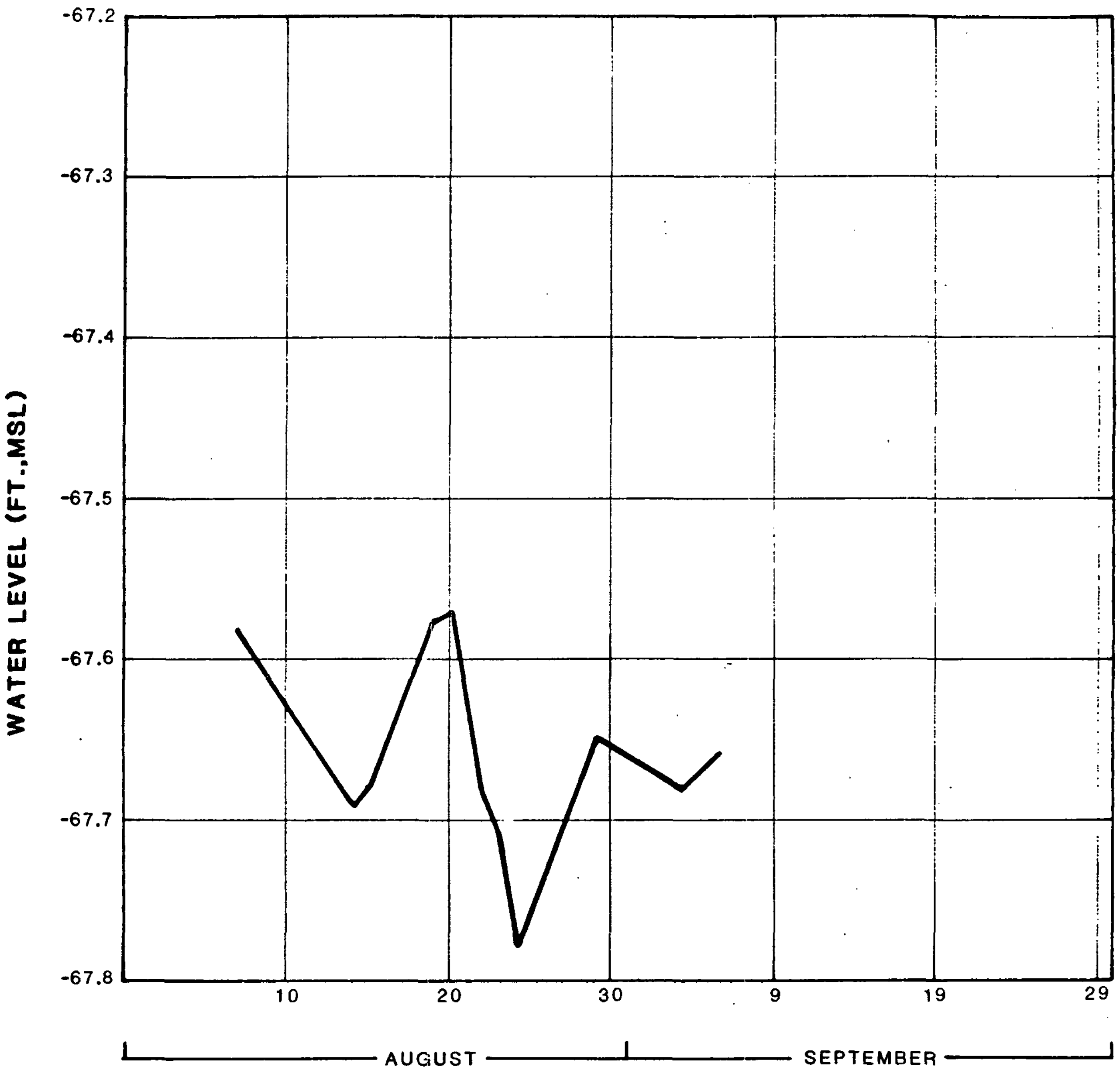
HYDROGRAPH
GW 25
FRENCH LIMITED

DRAWN BY:	DATE: 9-15-86	PROJECT NO. 275-14



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HOUSTON, TEXAS

HYDROGRAPH
REI 7
FRENCH LIMITED

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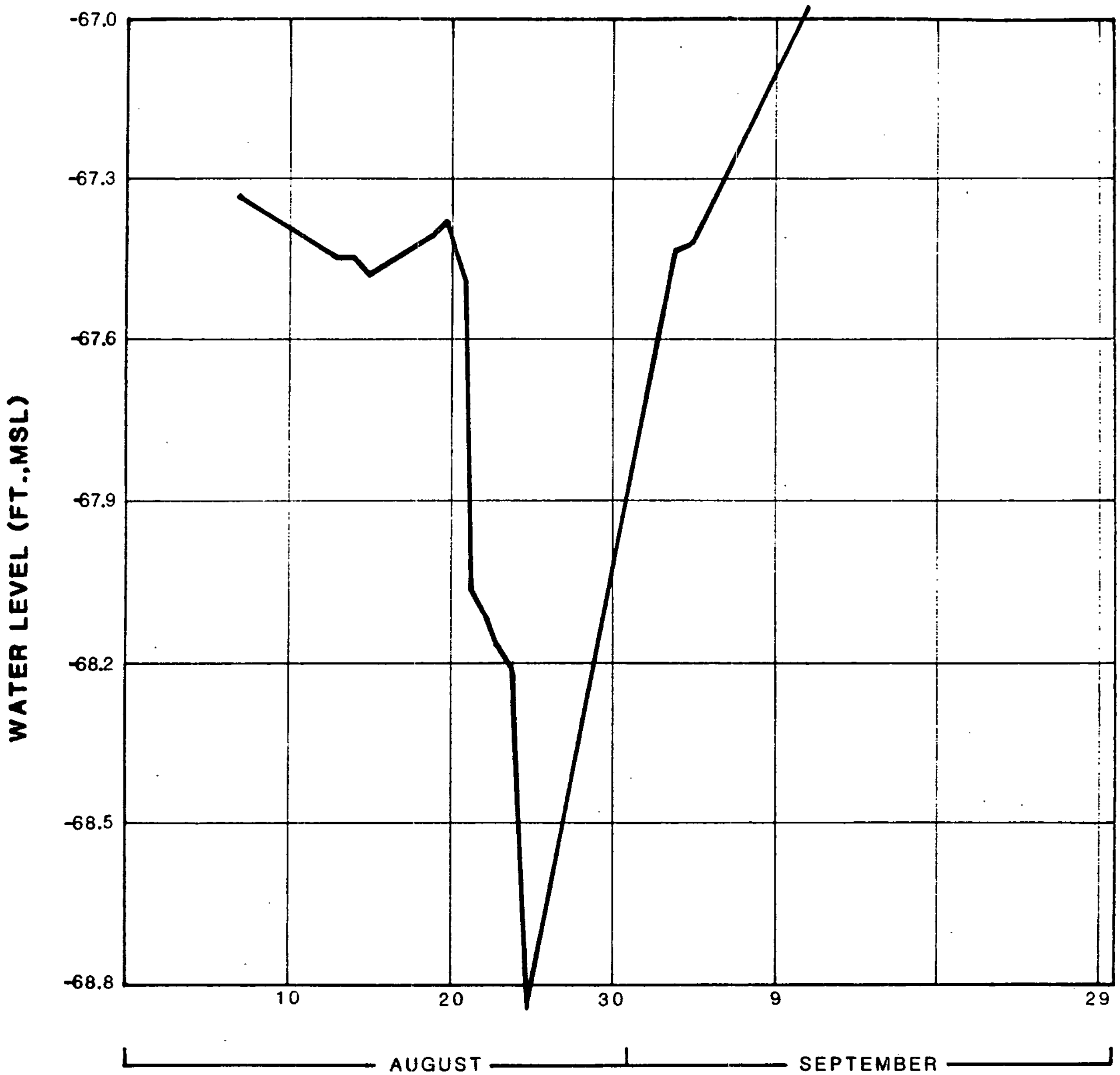

NOTE: SCALE DIFFERS FROM OTHER HYDROGRAPHS

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HYDROGRAPH
REI 11
FRENCH LIMITED

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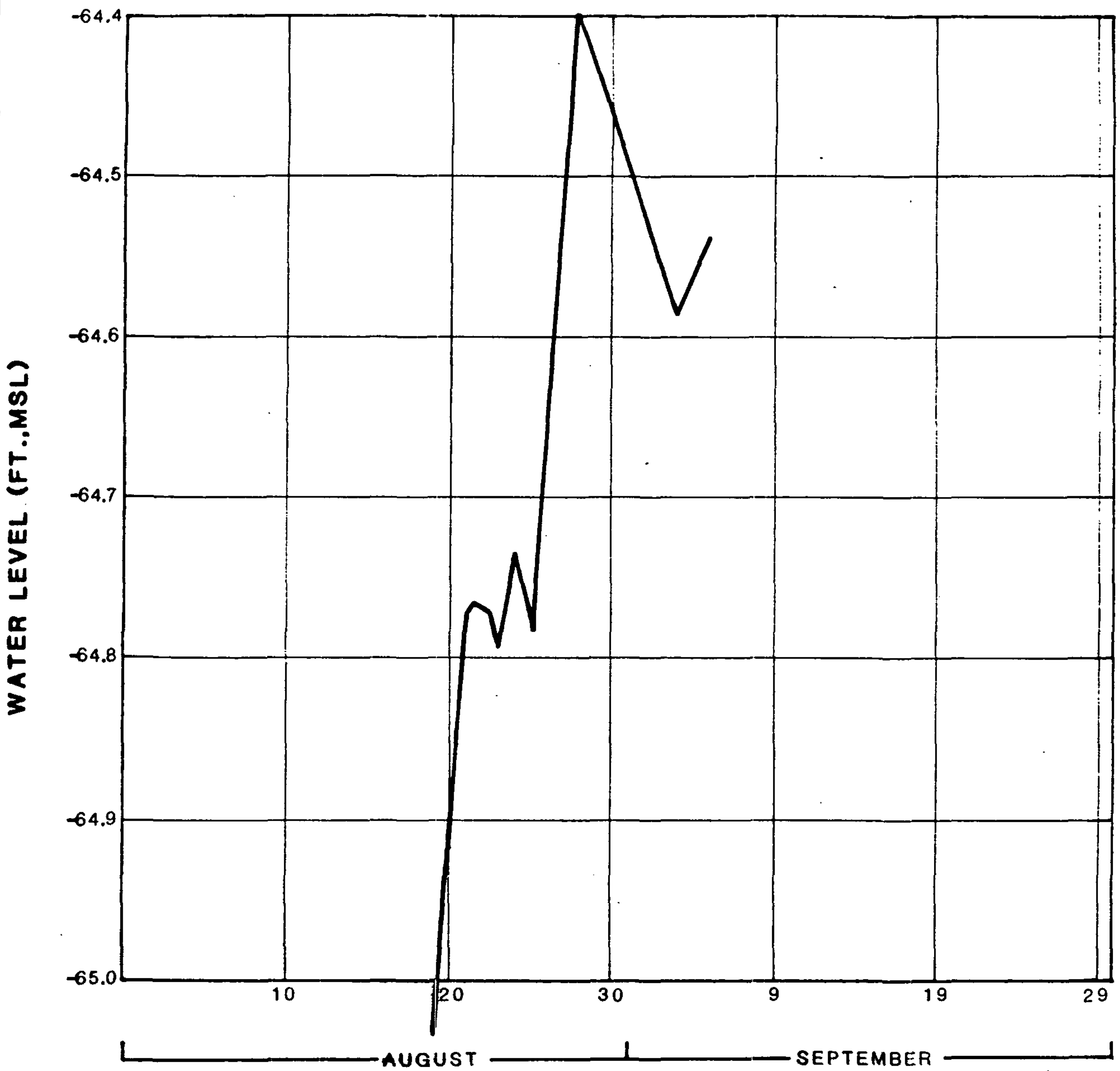

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

HYDROGRAPH
12-1
FRENCH LIMITED

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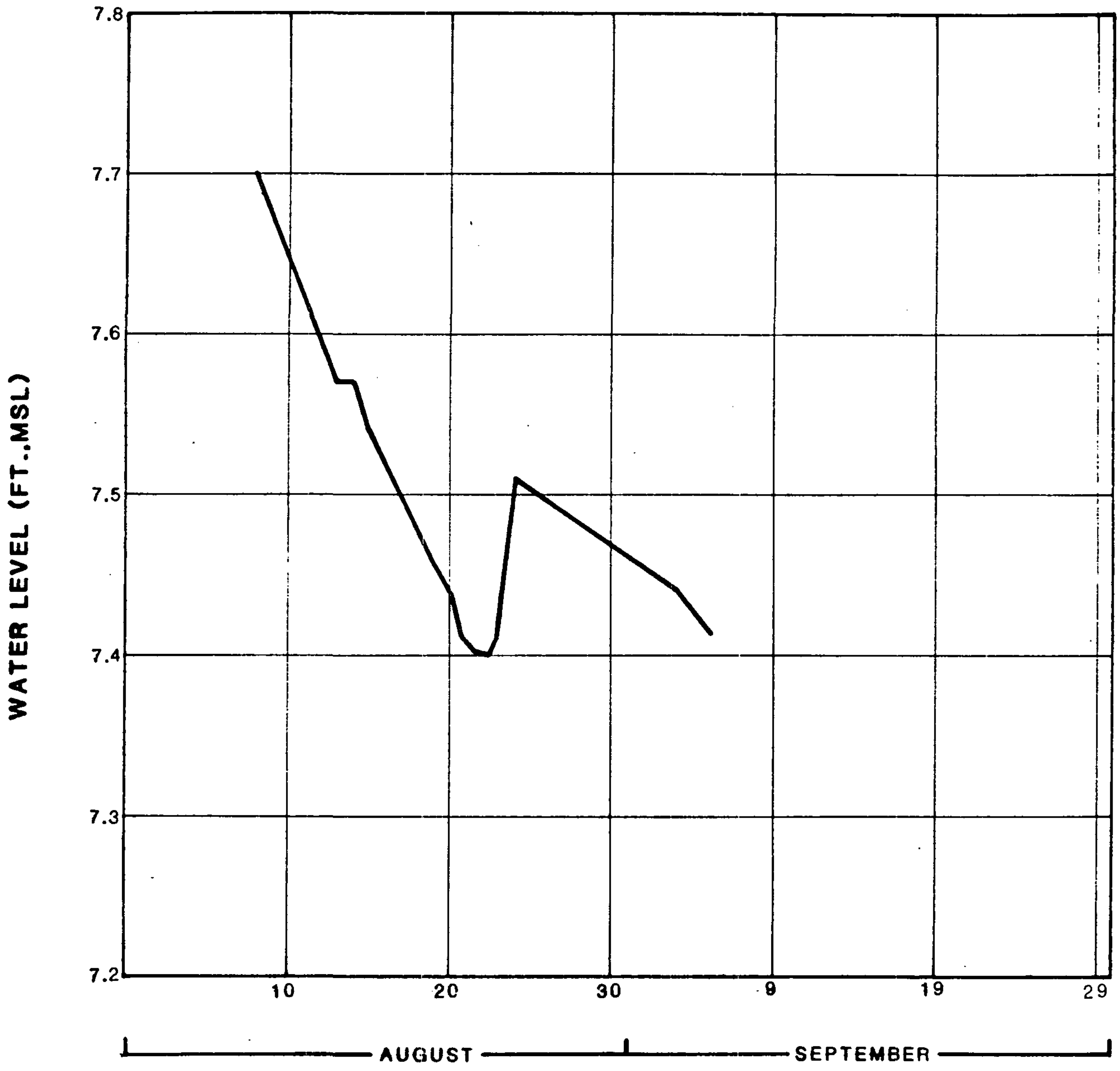

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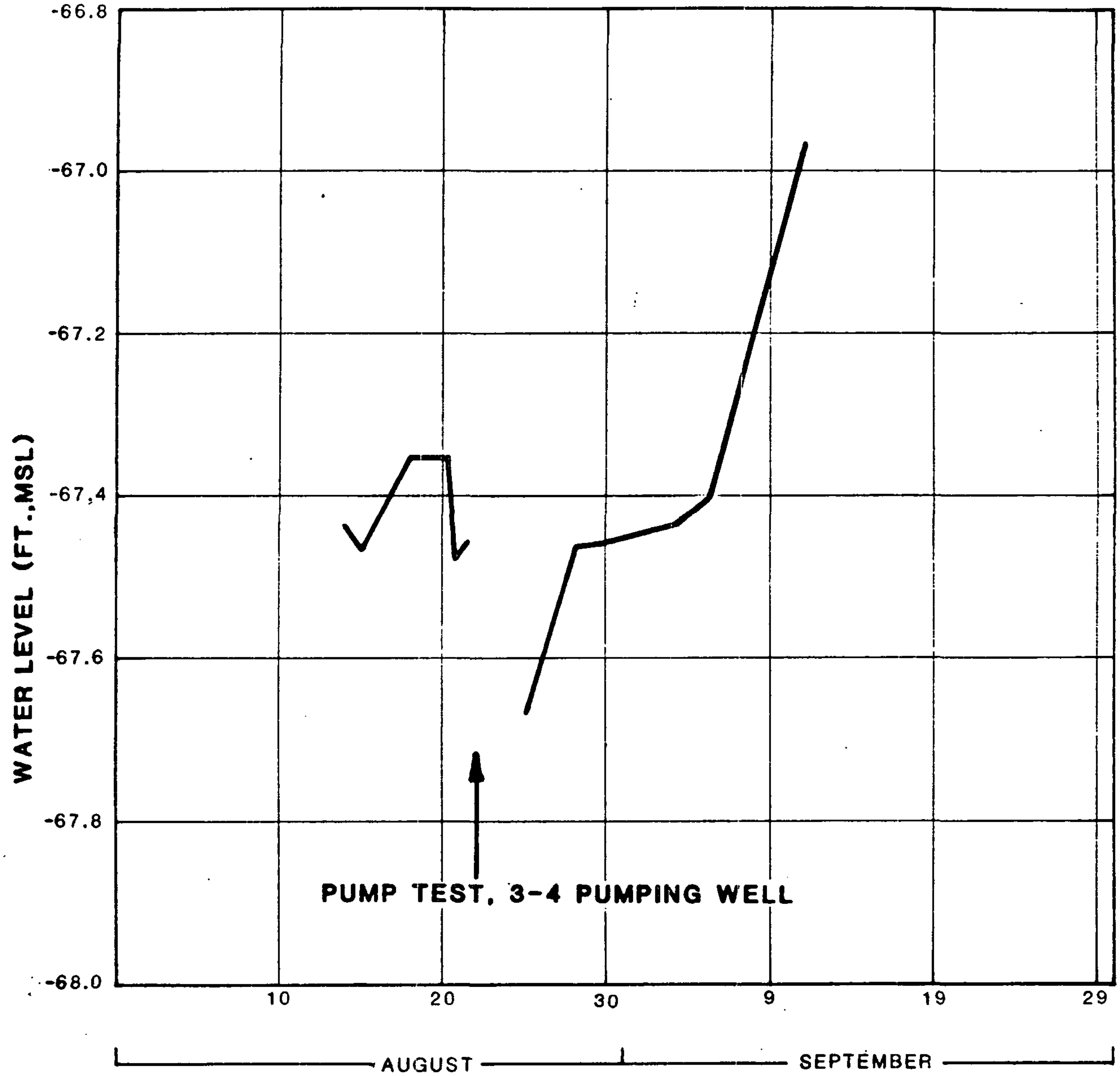

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ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

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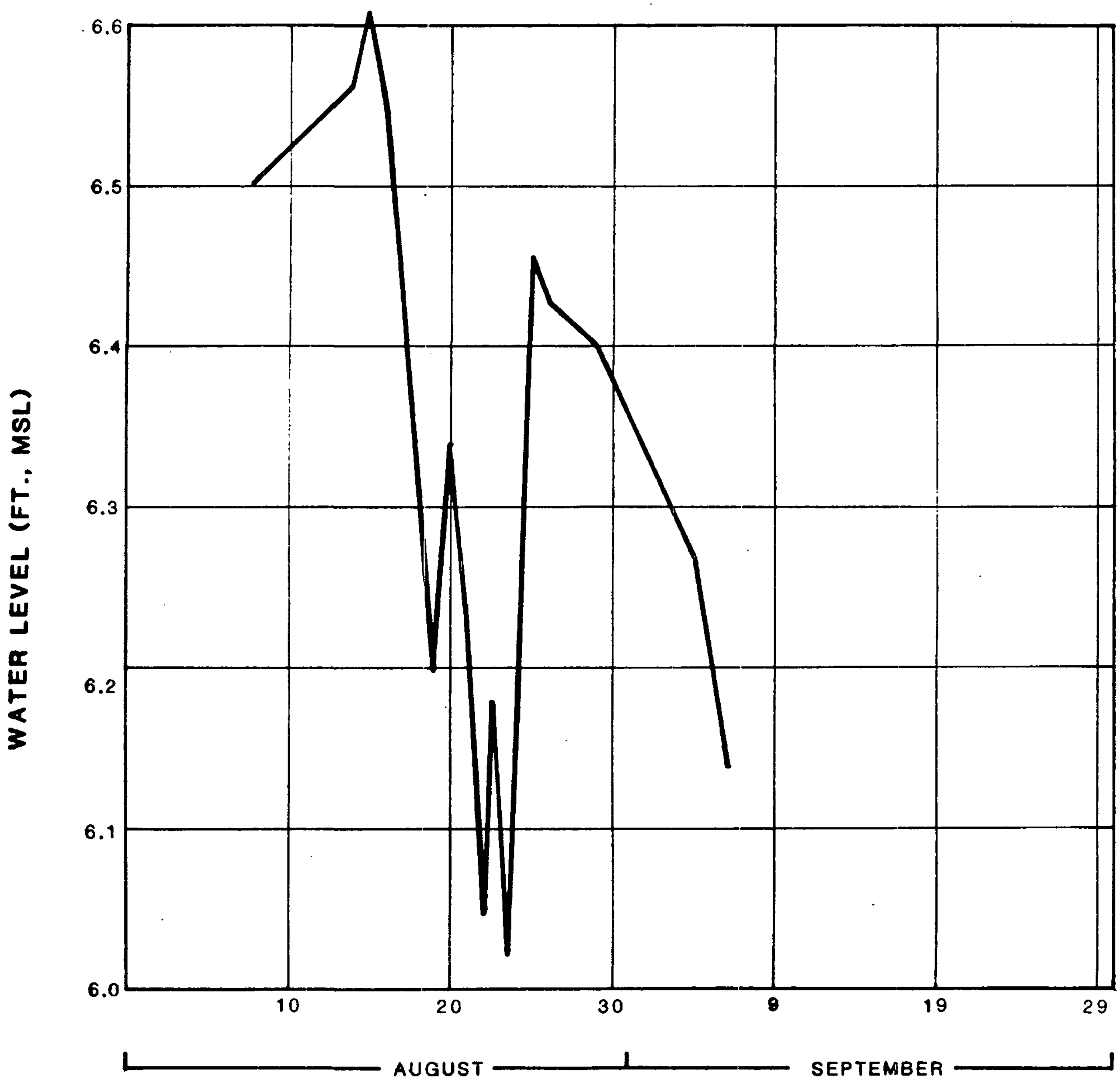


RESOURCE ENGINEERING INC.
ENVIRONMENTAL CONSULTANTS
HOUSTON, TEXAS

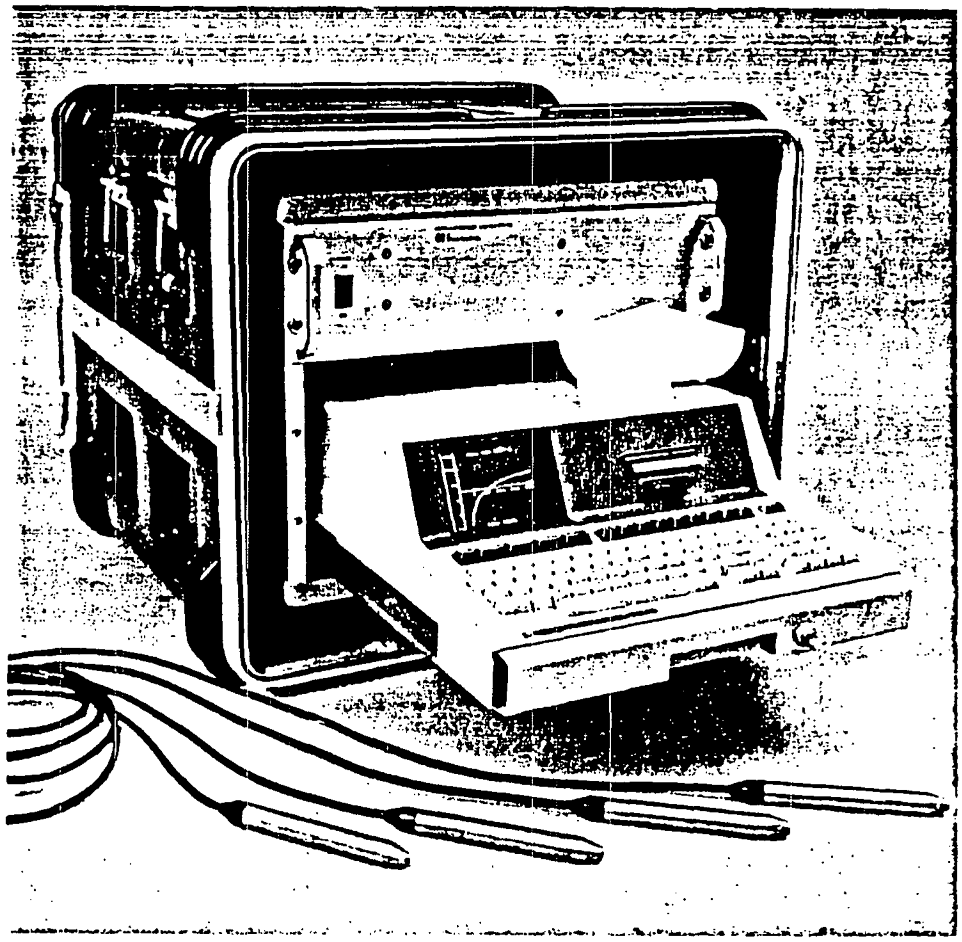
HYDROGRAPH
REI 3-5
FRENCH LIMITED

DRAWN BY:	DATE: 9-15-86	PROJECT NO. 275-14

<u>Appendix 15</u>

In-Situ SE-200 Computer System Operating Instruction

HYDROLOGIC ANALYSIS SYSTEM



SE200

OWNER'S MANUAL: HYDROLOGIC ANALYSIS SYSTEM

MODEL SE200

1982
Revised 4/84

GENERAL DESCRIPTION

The Hydrologic Analysis System Model SE200 is a computer based, automated, water level data acquisition and reduction system. It consists of four basic units: the data acquisition unit, the computer, the environmental enclosure, and water level transducers.

The data acquisition unit can excite and provide signal conditioning for up to 16 individual transducers. It also performs switching and interface functions, enabling the computer to read water level data from each transducer.

The computer (through the data acquisition unit) reads measurements from each transducer, controls the timing of each measurement, records each measurement (and the time it was taken), and permanently stores this data on magnetic tape. In addition, the computer reduces all data, providing plots and tables of real-time data during a test; the permanently recorded data can produce a complete report of the test at any time after test completion. In conjunction with the data acquisition unit and applicable accessories, the computer is capable of automatically controlling start and stop of one pump and automatically regulating discharge rate.

The environmental enclosure is a weather-proof container that holds the data acquisition unit and the computer; it provides shock mounting for these units, a sliding carriage for the computer, and complete protection during transportation and unattended operation.

Water level transducers measure hydrostatic pressure (which is a function of water level).

Three of the basic units of the SE200 are described in greater detail in the following sections.

1 Data Acquisition Unit

The data acquisition unit operates on 115/230 VAC, 47 to 440 Hz. Together with plug-in printed circuit boards, the data acquisition unit performs interface functions between the computer and transducers, as well as providing excitation and signal conditioning for the transducers. One data acquisition unit will support a maximum of 16 transducers; up to 13 additional data acquisition units can be connected, enabling the SE200 to support a maximum of 224 transducers.

The data acquisition unit supports four types of plug-in modules.

1.1 Control Module. The control module is an IEEE 488 interface that formats digital data for transfer to and from the computer.

1.2 A to D Module. The A to D module scans the analog transducer measurements on command from the computer and converts them to digital data.

1.3 Pump Module. The pump module automatically controls pump start and stop on command from the computer and processes valve control signals from the computer for transfer to the valve actuator for automatic adjustment of discharge rate.

1.4 4-20 mA Module. The 4-20 mA module excites the transducers and measures their output. Each 4-20 mA module can accept 4 transducers.

2 Computer

The computer used with the Hydrologic Analysis System is the Hewlett-Packard HP-85 with accessories.

1. the basic HP-85 desktop computer

2. two (optional) 128K modules, providing additional memory to expand the basic computer memory to a total of 288K. Full system performance is provided with the basic 32K memory. However, additional memory automatically loads all subprograms which would normally require manual reinsertion of the system software tape.

3. an HP-IB interface (IEEE 488), interfacing the HP-85 with peripheral equipment

The computer has a CRT display for real-time presentation of system activities and plots of data, a thermal printer for hard copy of plots and data tables, and a tape drive for mass data storage on data cartridges.

3 Transducers

The body of the transducer is labelled as follows:

In-Situ Inc.
SF: --

Druck Ltd.
PTX 160 D
-- psig
S/N --

SF is the abbreviation for scale factor. The value printed after this indicates the exact range of the transducer in psig. The scale factor is entered into the test program as one of the test specifications for each transducer.

PTX 160 D is the transducer model number.

-- psig indicates the design range of the transducer, which is also the limit of accurate measurement for the particular transducer. Water levels in excess of this value will produce an over-range indication (see Appendix C, p. 46).

The label on the transducer reel displays the following information:

Model No.: PTX 160/D
Serial No.: -------
Scale Factor: --
Range --- meters
Do not exceed ---- m

This gives the transducer range in approximate meters and warns the user not to exceed two times the full range.

3.1 Current Transmitter. Each water level transducer contains a 4-20 mA current transmitter and a strain gauge pressure sensor. The current transmitter prevents measurement sensitivity from being affected by cable length. Since all sensitive electronics are in the transducer and, thus, isolated in the constant temperature environment of the groundwater, errors due to variations in temperature are negligible. Very shallow water tables, however, can produce errors in data due to temperature variations. In such conditions the transducer may be subject to sensitivity and zero offset variations as a result of the temperature gradient imposed on near-surface water; since the temperature error band is ±0.3% very shallow appplications that may subject the transducer to very wide temperature variations have the potential for the following maximum errors:

Temperature Error Band (-2 to 30° C)

XD Range	Maximum Temperature Error
10 psi (6 m) (10 ft)	± 0.03 psi (0.02 m) (0.07 ft)
50 psi (30 m) (100 ft)	± 0.15 psi (0.1 m) (0.35 ft)
100 psi (60 m) (200 ft)	± 0.3 psi (0.2 m) (0.7 ft)

3.2 Pressure Sensor. The pressure sensor is specifically designed to be insensitive to barometric pressure changes. By incorporating a vent tube into the transducer cable, atmospheric pressure is the reference pressure to the sensor diaphragm. With this design it is absolutely essential the vent tube not be obstructed; if it is, temperature variations of the transducer cable will result in pressure variations of the air within the vent tube. These pressure changes will be reflected as errors in water level measurements.

The pressure sensor will tolerate an over pressure of twice the full range, but will not tolerate negative pressures.

3.3 Pressure Port. The pressure port of the transducer is protected by a guard. If necessary, the guard may be unscrewed. If the guard is removed, the sensor diaphragm must be protected; any object contacting the unprotected sensor diaphragm may destroy the transducer.

3.4 Transducer Cable. The jacket of the standard transducer cable is polyurethane. This polymer has been specially selected for its toughness, abrasion resistance, and flexibility at low temperatures, but it is important not to expose the cable to the sharp edges common to well casings. Strong solvents such as acetone and methyl ethyl ketone (MEK) will also destroy the cable.

The cable is blocked at the transducer connection to prevent entry of water. However, if the cable jacket is pierced and this damaged site is then submerged, water will enter the cable and then flow downward, with the potential for filling and destroying the transducer.

Transducer extension cable is available as a system option. Extension cables are vented at each connector. Consequently, extreme care must be taken to prevent water from entering these vents. If water does enter a vent it will cause data errors due to obstruction of air flow through the vent tube.

3.5 Cable Connectors. Cable connectors (with the exception noted above) are waterproof and will withstand normal environmental conditions. When not assembled in the system, the connectors of the cable must be protected.

3.6 Scale Factor. The SF (scale factor) value is equal to the transducer true full range sensitivity in PSIG. For example; A 10 PSIG transducer may have an actual calibration sensitivity of 9.38 PSIG over the operating range of 4 to 20 ma. This value must be entered when preparing test specifications (refer to Software Operation). The scale factor may be verified in the field by the following procedure:

A. Scale Factor Check

Using the system tape, set up the transducers as for normal water level measurement. Set up for the pre-run check option (see Appendix C, p. 28) and proceed as follows.

B. Pre-run Check

1. submerge transducer at a water level below the seasonal temperature variation.

2. accurately measure off and mark a known length on the transducer cable. For maximum accuracy, this length should approximate the transducer range minus the hydrostatic head of the initial transducer setting. For example, if the transducer range is 60 meters and the initial transducer setting submerges the transducer 2 meters below the water level, the measured length should be approximately 58 meters (units of measurement need not be metric).

3. record the water level indicated by the computer.

4. lower the transducer the measured distance of step 2 to its second setting.

5. record the water level indication for this second transducer setting.

6. calculate the transducer scale factor using the following equation:

$$SF2 = SF1 \cdot \frac{L}{\Delta W},$$

where SF2 = new scale factor
L = length measured in step 2
ΔW = difference between water level indications of steps 3 and 5
SF1 = old scale factor.

If the old scale factor (SF1) is unknown, substitute K from table 2.

Table 2

Scale Factor Verification

transducer range (meters)	K
6	10
30	50
60	100

Note:
The following factors will introduce errors when performing calibration by this technique.
1. Extreme temperature gradients related to shallow water tables, geothermal sites, etc.
2. Thermal expansion and contraction of air within the transducer cable vent tube as the cable passes between warmer and cooler environments outside and inside the well (transient error).
3. Slug effect caused by volumetric displacement of the transducer and cable in a low permeability situation.

3.7 Druck Pressure Transducer Specifications

Excitation Voltage	9 to 30 VDC
Output	4 to 20 mA
Setting Accuracies:	
Zero	4 mA, +0.5% FS
Full Scale	20 mA, -1% FS
Non-Linearity	±0.1% FS
Hysteresis	±0.02% FS
Repeatability	±0.02% FS
Self Noise	Nominal 0.05% FS Pk to Pk with 2.5 KHz cutoff
Long Term Stability	0.2% FS per year
Warm Up	Nominally 0.05% FS, 30 to 60 secs
Accuracy	
At Constant Temp:	±0.1% of Range
Temperature Error Band (TEB) at Constant Pressure	±0.3% of range over a temperature range of -2°C to 30°C; 28°F to 86°F
Operating Temperature Range	-20°C to 80°C; -4°F to 176°F
Storage Temperature Range	-55°C to 95°C; -67°F to 203°F
Overpressure Capability	2X Full Range
Media Compatibility	Groundwater with dissolved H_2S, seawater, salt brine
Size	0.59" dia. X ≃ 8.5" long
Pressure Connection	0.58" X 32 TPI 55 DEG (Witworth form)
Wetted Materials	Titanium, Quartz, Polyurethane, Delrin, Silicone, Grease, Silicone RTV, Stainless Steel

3.8 Transducer Installation. When a transducer is installed in a well with a pump, it is important to install an access tube with the pump column. This will prevent the transducer cable from becoming entangled with the pump column. A tubing ID of one-inch minimum is recommended.

<u>Appendix 16</u>

REI 3-4 Run #2 Pumping Test Data Sheets

117.64
81.64
36.00

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ___

PROJECT: French LTD REI 3-4 Pump Test

JOB NO.: ___

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ___ DATE: ___

CHECKED BY: ___ DATE: ___

Run #2 Well 3-4 81.69

	FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
8-21-86	START Pump	16:30	RQ		1.6	2026	D.D
	1.6	16:32	RQ		1.6	2045	D.D
	1.6	16.33	RQ		1.6	2103	D.D
	1.6	16.40	RQ		1.6	2127	D.D
	1.6	16.44	RQ		1.6	2144	Ari
	1.6	16.50	RQ		1.6	2207	D.D
	1.6	16.59	RQ		1.6	2220	D.D
	1.6	17:05	GCT		1.6	2256	CWA
	1.6	17:11	D.D		1.6	2311	D.D
	1.6	17:20	D.D		1.6	2332	D.D
	1.6	17:30	D.D		1.6	2350	D. Dod
	1.6	17:29	Ari	8-22-86	1.6	0011	CWA
	1.6	17:35	Ari		1.6	0029	D. Dod
	1.6	17:47	D.D		1.6	0050	D. Dod
	1.6	18:05	D.D		1.6	0113	D. Dod
	1.6	1811	D.D		1.6	0135	D. Dod
	1.6	18:20	RQ		1.6	0148	D. Dod
	1.6	18:27	RQ		1.6	0215	D. Dod
	1.6	1838	D.D		1.6	0244	D. Dod
	1.6	1844	D.D		1.55	0302	D. Dod
	1.6	1858	DD		1.6	0310	D. Dod
	1.6	1907	DD		1.55	0319	D. Dod
		1922 - flow fluctuates 0.2 gpm			1.5	0331	D. Dod
	1.6	1928	D.D		1.55	0345	D. Dod
	1.6	1949	D.D		1.6	0359	D. Dod
	1.6	2003	DD		1.6	0417	D. Dod
	1.6	2015	DD		1.6	0430	D. Dod

CALCULATIONS AND COMPUTATIONS SHEET 2 OF ___

PROJECT: FRENCH LTD. REI 3-Y Pump Test JOB NO.: ___

SUBJECT: FLOW RATE MONITORING SHEET COMPUTED BY: ___ DATE: ___

French Well 3-4, 8/22/86 RUN #2 CHECKED BY: ___ DATE: ___

FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
1.6	0445	D. Dod		1.6	1333	RSA
1.6	0459	D. Dod	Fluctuating betw. 1.8 and 1.3 RSA	1.6	1407	RSA
1.6	0515	D. Dod		1.6	1432	RSA
1.6	0530	D. Dod	Fluctuations	1.6	1456	RSA
1.6	0545	D. Dod		1.6	1534	RSA
1.6	0559	D. Dod		1.6	1558	RSA
1.6	0615	D. Dod		1.6	1607	RSA
1.6	0630	D. Dod		1.5	1621	RSA
1.6	0646	D. Dod	dropping to 1.5 consistently	1.6	1637	RSA
1.6	0713	D. Dod		1.5-1.6	1643	RSA
1.6	0733	D. Dod		1.5	1700	RSA
~~1.6~~ 1.6	0743	RSA		1.5 ± 0.2	1738	D.D
1.6	0756	RSA		1.5	1753	D.D
1.6	0817	RSA	Fluctuate betw. 1.5 + 1.6 RSA	1.5 ± 0.1	1815	D.D
1.6	0830	RSA		1.55	1838	D.D
1.6	0830	RSA		1.5	1857	D.D
1.6	0900	RSA		1.55	1926	DD
1.6	0915	RSA	Discharge changed to new tanker	1.5 ± .2	1947	D.D
1.6	0929	RSA	Fluctuating betw 1.4-1.7 RSA	1.65	1956	D.D
1.6	1000	RSA	unstable	1.65	2007	D.D
1.6	1023	RSA	unstable	1.5	2028	D.D
1.6-1.7	1038	RSA	unstable	1.6 ± 0.1	2049	D.D
1.6	1118	RSA	Fluctuations start at this time *	1.1 → 1.9	2111	D.D
1.6	1132	RSA	Flow adjusted down to 1.4 gpm →	1.4	2115	DD
1.6	1146	RSA				
1.6	1202	RSA				
1.6	1251	RSA				
1.6	1315	RSA				

* from 2111 to 2115, the flow rate had oscillated from 1.1 → 1.9 - with occassional bubbles - perhaps indicating breaking of suction. Flow rate adjusted to 1.4 without turning off pump.

CALCULATIONS AND COMPUTATIONS

SHEET 3 OF

PROJECT: FRENCH LTD REI 3-4 Pump Test JOB NO.: 275-14

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: DATE:

CHECKED BY: DATE:

French well 3-4 8/22/81 Run #2

	FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
stable.	1.4	2123	D.D		1.4	0724	DD
Stable	1.4	2129	D.D		1.4	0745	OCM
stable	1.4	2140	D.D	Slight Turbulence	1.4	0813	OCM
stable	1.4	2156	D.D	"	1.4	0830	OCM
stable	1.4	2214	D.D	"	1.4	0857	OCM
Stable	1.4	2222	D.D		1.4	926	OCM
stable	1.4	2234	D.D		1.4	10:04	Am
" "	1.4	2247	D.D		1.4	10:34	Am
	1.4	2300	OCM		1.4	11:30	Am
	1.4	2319	D. Dod		1.4	12:15	Am
	1.4	2341	CWA		1.4	13:20	Am
steady 8-23	1.4	0004	D. Dod		1.4	13:40	Am
"	1.4	0029	D.D		1.4	14:30	Am
"	1.4	0105	DD		1.4	14:55	Am
	1.4	0128	DD		1.4	15:10	pl
	1.4	0205	DD		1.4	15:35	pl
steady	1.4	0239	DD		1.4	16:00	pl
"	1.4	0300	DD		1.4	16:23	pl
"	1.4	0328	DD		1.4	16.46	pl
	1.4	0346	CWA		1.4	17.05	pl
	1.4	0408	CWA		1.4	17.24	pl
	1.4	0432	DD		1.4	18:06	pl
	1.4	0457	DD		1.4	18:30	pl
steady	1.4	0533	DD		1.4	18:52	pl
	1.4	0609	DD		1.4	19:14	pl
	1.4	0634	DD		1.4	19:30	pl
	1.4	0704	DD		1.4	20:17	pl

CALCULATIONS AND COMPUTATIONS

SHEET 4 OF ___

PROJECT: FRENCH LTD RET 3-4 Pump Test JOB NO.: 275-14

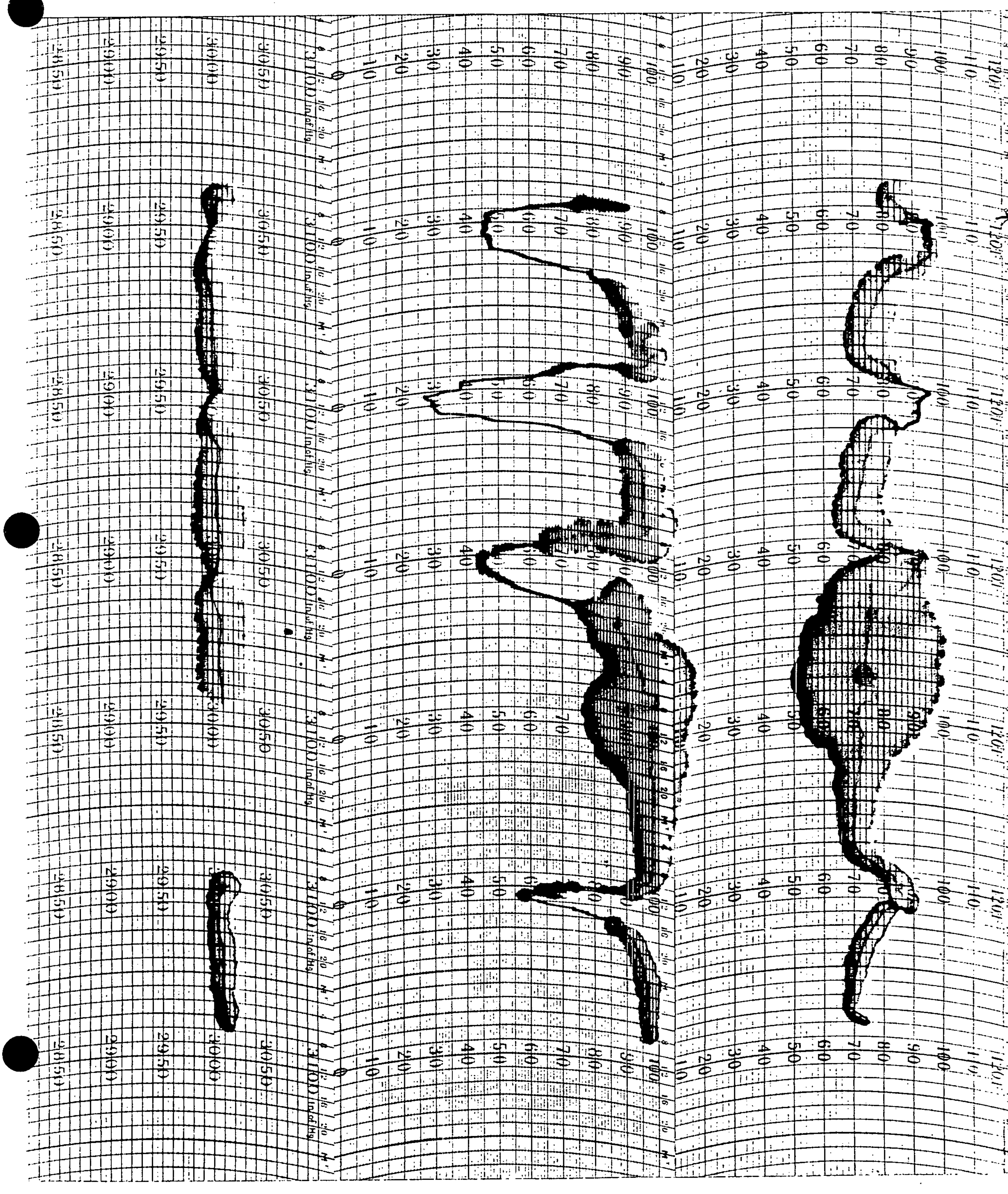
SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ___ DATE: ___

CHECKED BY: ___ DATE: ___

FLOW RATE	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
1.4	20:27	RK	1.45	1150	DD
1.4	20:49	DRG	1.4	1221	DD
1.4	21:24	DRG	1.43	1252	DD
1.4	21:54	RK	1.45	~~1~~1300	DD
1.4	22:07	RK	1.45	1324	DD
1.4	22:47	DRG	1.45	1358	DD
1.4	23:39	SCI	1.45	1424	DD
8-24-86 → 1.4	00:22	SCI	1.45	1445	DD
1.4	01 44	SCI	1.45	1509	RK
1.4	0211	SCI	1.45	1534	BCM
1.4	0240	SCI	1.45	1547	CWA
1.4	0327	SCI	1.45	16:14	CWA
1.4	0401	SCI	1.45	16:24	RK
1.4	0438	SCI	1.40	16:44	RK
1.4	0530	SCI			
1.4	0626	SCI			
1.4	0639	SCI			
1.4	0652	RSA			
1.45	0718	[illegible]			
1.45	0734	D. Rod			
1.45	0807	D.D.			
1.45	0840	DD			
1.45	0936	DD			
1.45	1005	DD			
1.45	1028	[illegible]			
1.45	1043	DD			
1.45	1121	DD			

Begin 9:35am 6-20-8?



PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-4 INPUT 1
RADIUS: 0.166 FEET
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 81.69 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
16:30	0.000	81.69	0.00	0.00E+00
16:30	0.084	82.11	-0.42	2.12E-03
16:30	0.167	82.51	-0.82	4.21E-03
16:30	0.251	82.81	-1.12	6.33E-03
16:30	0.334	83.04	-1.35	8.42E-03
16:30	0.417	83.21	-1.52	1.05E-02
16:30	0.501	83.40	-1.71	1.26E-02
16:30	0.584	83.57	-1.88	1.47E-02
16:30	0.667	83.72	-2.03	1.68E-02
16:30	0.751	84.00	-2.31	1.89E-02
16:30	0.834	84.11	-2.42	2.10E-02
16:30	0.917	84.34	-2.65	2.31E-02
16:31	1.001	84.48	-2.79	2.52E-02
16:31	1.391	85.18	-3.49	3.51E-02
16:31	1.724	85.73	-4.04	4.34E-02
16:32	2.058	86.41	-4.72	5.19E-02
16:32	2.391	87.07	-5.38	6.03E-02
16:32	2.724	87.61	-5.92	6.86E-02
16:33	3.058	88.23	-6.54	7.71E-02
16:33	3.391	88.79	-7.10	8.55E-02
16:33	3.724	89.40	-7.71	9.38E-02
16:34	4.058	89.94	-8.25	1.02E-01
16:34	4.391	90.49	-8.80	1.11E-01
16:34	4.724	90.99	-9.30	1.19E-01
16:35	5.058	91.56	-9.87	1.27E-01
16:35	5.391	91.96	-10.27	1.36E-01
16:35	5.724	92.62	-10.93	1.44E-01
16:36	6.058	92.98	-11.29	1.53E-01
16:36	6.391	93.51	-11.82	1.61E-01
16:36	6.724	93.93	-12.24	1.69E-01
16:37	7.058	94.36	-12.67	1.78E-01
16:37	7.391	94.74	-13.05	1.86E-01
16:37	7.724	95.21	-13.52	1.95E-01
16:38	8.058	95.61	-13.92	2.03E-01
16:38	8.391	95.99	-14.30	2.11E-01
16:38	8.724	96.39	-14.70	2.20E-01
16:39	9.058	96.78	-15.09	2.28E-01
16:39	9.391	97.15	-15.46	2.37E-01
16:39	9.724	97.49	-15.80	2.45E-01
16:40	10.058	98.00	-16.31	2.53E-01

16:42	12.153	100.01	-18.32	3.06E-01
16:44	14.153	101.84	-20.15	3.57E-01
16:46	16.423	103.71	-22.02	4.14E-01
16:48	18.762	105.40	-23.71	4.73E-01
16:50	20.193	106.32	-24.63	5.09E-01
16:52	22.193	107.70	-26.01	5.59E-01
16:54	24.193	108.89	-27.20	6.10E-01
16:56	26.193	109.82	-28.13	6.60E-01
16:58	28.193	110.79	-29.10	7.10E-01
17:00	30.193	111.62	-29.93	7.61E-01
17:02	32.193	112.19	-30.50	8.11E-01
17:04	34.158	112.86	-31.17	8.61E-01
17:06	36.158	113.42	-31.73	9.11E-01
17:08	38.158	113.87	-32.18	9.62E-01
17:10	40.158	114.42	-32.73	1.01E+00
17:12	42.158	114.75	-33.06	1.06E+00
17:14	44.158	115.10	-33.41	1.11E+00
17:16	46.158	115.54	-33.85	1.16E+00
17:18	48.158	115.90	-34.21	1.21E+00
17:20	50.158	116.27	-34.58	1.26E+00
17:22	52.158	116.51	-34.82	1.31E+00
17:24	54.158	116.63	-34.94	1.36E+00
17:26	56.158	116.86	-35.17	1.42E+00
17:28	58.158	117.10	-35.41	1.47E+00
17:30	60.158	117.13	-35.44	1.52E+00
17:32	62.247	117.17	-35.48	1.57E+00
17:34	64.135	117.25	-35.56	1.62E+00
17:36	66.135	117.27	-35.58	1.67E+00
17:38	68.135	117.14	-35.45	1.72E+00
17:40	70.135	117.27	-35.58	1.77E+00
17:42	72.135	117.44	-35.75	1.82E+00
17:44	74.135	117.83	-36.14	1.87E+00
17:46	76.135	118.21	-36.52	1.92E+00
17:48	78.135	118.50	-36.81	1.97E+00
17:50	80.782	118.79	-37.10	2.04E+00
17:52	82.182	118.86	-37.17	2.07E+00
17:54	84.070	119.18	-37.49	2.12E+00
17:56	86.070	119.48	-37.79	2.17E+00
17:58	88.070	119.70	-38.01	2.22E+00
18:00	90.070	120.06	-38.37	2.27E+00
18:02	92.070	120.33	-38.64	2.32E+00
18:04	94.070	120.47	-38.78	2.37E+00
18:06	96.070	120.73	-39.04	2.42E+00
18:08	98.115	120.96	-39.27	2.47E+00
18:10	100.120	121.14	-39.45	2.52E+00
18:30	120.280	122.94	-41.25	3.03E+00
18:50	140.220	122.69	-41.00	3.53E+00
19:10	160.220	123.35	-41.66	4.04E+00
19:30	180.220	123.45	-41.76	4.54E+00
20:10	220.500	123.66	-41.97	5.56E+00
20:30	240.270	123.52	-41.83	6.06E+00
20:50	260.330	123.72	-42.03	6.56E+00
21:10	280.330	123.69	-42.00	7.06E+00
21:30	300.230	123.69	-42.00	7.57E+00
21:50	320.280	123.70	-42.01	8.07E+00
22:10	340.320	123.69	-42.00	8.58E+00

22:30	360.300	123.69	-42.00	9.08E+00
22:50	380.270	123.70	-42.01	9.58E+00
23:10	400.270	123.70	-42.01	1.01E+01
23:30	420.270	123.70	-42.01	1.06E+01
23:50	440.270	123.70	-42.01	1.11E+01
00:10	460.270	123.70	-42.01	1.16E+01
00:30	480.270	123.70	-42.01	1.21E+01
00:50	500.270	123.70	-42.01	1.26E+01
01:10	520.270	123.70	-42.01	1.31E+01
01:30	540.220	123.72	-42.03	1.36E+01
01:50	560.230	123.72	-42.03	1.41E+01
02:10	580.230	123.72	-42.03	1.46E+01
02:30	600.230	123.72	-42.03	1.51E+01
02:50	620.230	123.72	-42.03	1.56E+01
03:10	640.230	123.72	-42.03	1.61E+01
03:30	660.230	123.73	-42.04	1.66E+01
03:50	680.230	123.72	-42.03	1.71E+01
04:10	700.180	123.72	-42.03	1.76E+01
04:30	720.320	123.72	-42.03	1.82E+01
04:50	740.280	123.72	-42.03	1.87E+01
05:10	760.280	123.72	-42.03	1.92E+01
05:30	780.280	123.70	-42.01	1.97E+01
05:50	800.320	123.70	-42.01	2.02E+01
06:10	820.320	123.72	-42.03	2.07E+01
06:30	840.320	123.72	-42.03	2.12E+01
06:50	860.320	123.72	-42.03	2.17E+01
07:10	880.320	123.72	-42.03	2.22E+01
07:30	900.320	123.70	-42.01	2.27E+01
07:50	920.320	123.72	-42.03	2.32E+01
08:10	940.320	123.70	-42.01	2.37E+01
08:30	960.320	123.70	-42.01	2.42E+01
08:50	980.320	123.70	-42.01	2.47E+01
10:10	1060.500	123.70	-42.01	2.67E+01
11:10	1120.200	123.68	-41.99	2.82E+01
12:10	1180.200	123.68	-41.99	2.97E+01
13:10	1240.200	123.66	-41.97	3.13E+01
14:10	1300.200	123.68	-41.99	3.28E+01
15:10	1360.200	123.68	-41.99	3.43E+01
16:10	1420.200	123.68	-41.99	3.58E+01
17:10	1480.200	123.68	-41.99	3.73E+01
18:10	1540.100	123.68	-41.99	3.88E+01
19:10	1600.300	123.68	-41.99	4.03E+01
20:10	1660.300	123.68	-41.99	4.18E+01
21:10	1720.300	123.68	-41.99	4.34E+01
22:10	1780.200	123.68	-41.99	4.49E+01
23:10	1840.200	123.68	-41.99	4.64E+01
00:10	1900.200	123.66	-41.97	4.79E+01
01:10	1960.300	123.68	-41.99	4.94E+01
02:10	2020.300	123.68	-41.99	5.09E+01
03:10	2080.200	123.68	-41.99	5.24E+01
04:10	2140.200	123.68	-41.99	5.39E+01
05:10	2200.200	123.69	-42.00	5.54E+01
06:10	2260.200	123.69	-42.00	5.70E+01
07:10	2320.200	123.69	-42.00	5.85E+01
08:10	2380.300	123.72	-42.03	6.00E+01
09:10	2440.200	123.68	-41.99	6.15E+01

10:10	2500.300	122.72	-41.03	6.30E+01
11:10	2560.300	123.66	-41.97	6.45E+01
12:10	2620.300	123.68	-41.99	6.60E+01
13:10	2680.300	122.55	-40.86	6.75E+01
14:10	2740.200	123.68	-41.99	6.91E+01
15:10	2800.200	123.66	-41.97	7.06E+01
16:10	2860.300	123.57	-41.88	7.21E+01
17:10	2920.200	123.68	-41.99	7.36E+01
18:10	2980.200	123.68	-41.99	7.51E+01
19:10	3040.200	123.49	-41.80	7.66E+01
20:10	3100.200	123.68	-41.99	7.81E+01
21:10	3160.200	123.68	-41.99	7.96E+01
22:10	3220.200	123.68	-41.99	8.12E+01
23:10	3280.200	123.68	-41.99	8.27E+01
00:10	3340.200	123.22	-41.53	8.42E+01
01:10	3400.200	123.39	-41.70	8.57E+01
02:10	3460.200	123.66	-41.97	8.72E+01
03:10	3520.200	123.66	-41.97	8.87E+01
04:10	3580.200	123.66	-41.97	9.02E+01
05:10	3640.200	123.66	-41.97	9.17E+01
06:10	3700.200	123.09	-41.40	9.32E+01
07:10	3760.400	121.10	-39.41	9.48E+01
08:10	3820.200	121.89	-40.20	9.63E+01
09:10	3880.200	122.43	-40.74	9.78E+01
10:10	3940.200	122.12	-40.43	9.93E+01
11:10	4000.200	121.73	-40.04	1.01E+02
12:10	4060.300	123.05	-41.36	1.02E+02
13:10	4120.200	121.57	-39.88	1.04E+02
14:10	4180.200	122.67	-40.98	1.05E+02
15:10	4240.300	122.44	-40.75	1.07E+02
16:10	4300.200	122.44	-40.75	1.08E+02
16:59	4349.700	122.67	-40.98	1.10E+02

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 (INPUT 1)
WELL MATERIAL: PVC
RADIUS: 0.166 FEET
STARTING WATER LEVEL: 81.690 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 122.680 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
0.084	122.46	0.22	2.12E-03	40.77	5.18E+04
0.167	122.29	0.39	4.21E-03	40.60	2.60E+04
0.251	122.10	0.58	6.33E-03	40.41	1.73E+04
0.334	121.92	0.76	8.42E-03	40.23	1.30E+04
0.417	121.72	0.96	1.05E-02	40.03	1.04E+04
0.501	121.52	1.16	1.26E-02	39.83	8.68E+03
0.584	121.30	1.38	1.47E-02	39.61	7.45E+03
0.667	121.10	1.58	1.68E-02	39.41	6.52E+03
0.751	120.90	1.78	1.89E-02	39.21	5.79E+03
0.834	120.70	1.98	2.10E-02	39.01	5.22E+03
0.917	120.50	2.18	2.31E-02	38.81	4.74E+03
1.001	120.30	2.38	2.52E-02	38.61	4.35E+03
1.389	119.37	3.31	3.50E-02	37.68	3.13E+03
1.723	118.59	4.09	4.34E-02	36.90	2.53E+03
2.056	117.81	4.87	5.18E-02	36.12	2.12E+03
2.389	117.06	5.62	6.02E-02	35.37	1.82E+03
2.723	116.31	6.37	6.86E-02	34.62	1.60E+03
3.056	115.57	7.11	7.70E-02	33.88	1.42E+03
3.389	114.85	7.83	8.54E-02	33.16	1.28E+03
3.723	114.14	8.54	9.38E-02	32.45	1.17E+03
4.056	113.45	9.23	1.02E-01	31.76	1.07E+03
4.389	112.77	9.91	1.11E-01	31.08	9.92E+02
4.723	112.09	10.59	1.19E-01	30.40	9.22E+02
5.056	111.43	11.25	1.27E-01	29.74	8.61E+02
5.389	110.79	11.89	1.36E-01	29.10	8.08E+02
5.723	110.15	12.53	1.44E-01	28.46	7.61E+02
6.056	109.52	13.16	1.53E-01	27.83	7.19E+02
6.389	108.90	13.78	1.61E-01	27.21	6.82E+02
6.723	108.30	14.38	1.69E-01	26.61	6.48E+02
7.056	107.72	14.96	1.78E-01	26.03	6.17E+02
7.389	107.13	15.55	1.86E-01	25.44	5.90E+02
7.723	106.57	16.11	1.95E-01	24.88	5.64E+02
8.056	106.00	16.68	2.03E-01	24.31	5.41E+02
8.389	105.46	17.22	2.11E-01	23.77	5.20E+02

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 (INPUT 1)
WELL MATERIAL: PVC
RADIUS: 0.166 FEET
STARTING WATER LEVEL: 81.690 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 122.680 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
8.723	104.92	17.76	2.20E-01	23.23	5.00E+02
9.056	104.39	18.29	2.28E-01	22.70	4.81E+02
9.389	103.87	18.81	2.37E-01	22.18	4.64E+02
9.723	103.36	19.32	2.45E-01	21.67	4.48E+02
10.056	102.86	19.82	2.53E-01	21.17	4.34E+02
12.165	99.90	22.78	3.07E-01	18.21	3.59E+02
14.495	97.07	25.61	3.65E-01	15.38	3.01E+02
16.165	95.26	27.42	4.07E-01	13.57	2.70E+02
18.165	93.35	29.33	4.58E-01	11.66	2.40E+02
20.203	91.66	31.02	5.09E-01	9.97	2.16E+02
22.203	90.20	32.48	5.60E-01	8.51	1.97E+02
24.225	88.92	33.76	6.10E-01	7.23	1.81E+02
26.225	87.81	34.87	6.61E-01	6.12	1.67E+02
28.225	86.83	35.85	7.11E-01	5.14	1.55E+02
30.225	86.01	36.67	7.62E-01	4.32	1.45E+02
32.225	85.31	37.37	8.12E-01	3.62	1.36E+02
34.225	84.73	37.95	8.63E-01	3.04	1.28E+02
36.225	84.23	38.45	9.13E-01	2.54	1.21E+02
38.225	83.83	38.85	9.63E-01	2.14	1.15E+02
40.225	83.50	39.18	1.01E+00	1.81	1.09E+02
42.225	83.24	39.44	1.06E+00	1.55	1.04E+02
44.225	83.04	39.64	1.11E+00	1.35	9.94E+01
46.225	82.90	39.78	1.16E+00	1.21	9.51E+01
48.225	82.78	39.90	1.22E+00	1.09	9.12E+01
50.225	82.70	39.98	1.27E+00	1.01	8.76E+01
52.225	82.65	40.03	1.32E+00	0.96	8.43E+01
54.225	82.62	40.06	1.37E+00	0.93	8.12E+01
56.225	82.58	40.10	1.42E+00	0.89	7.84E+01
58.225	82.55	40.13	1.47E+00	0.86	7.57E+01
60.225	82.54	40.14	1.52E+00	0.85	7.32E+01
62.225	82.52	40.16	1.57E+00	0.83	7.09E+01
64.225	82.52	40.16	1.62E+00	0.83	6.87E+01
66.225	82.51	40.17	1.67E+00	0.82	6.67E+01
68.225	82.51	40.17	1.72E+00	0.82	6.48E+01

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 (INPUT 1)
WELL MATERIAL: PVC
RADIUS: 0.166 FEET
STARTING WATER LEVEL: 81.690 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 122.680 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
70.225	82.50	40.18	1.77E+00	0.81	6.29E+01
72.225	82.50	40.18	1.82E+00	0.81	6.12E+01
74.225	82.48	40.20	1.87E+00	0.79	5.96E+01
76.225	82.48	40.20	1.92E+00	0.79	5.81E+01
78.225	82.47	40.21	1.97E+00	0.78	5.66E+01
80.225	82.47	40.21	2.02E+00	0.78	5.52E+01
82.225	82.45	40.23	2.07E+00	0.76	5.39E+01
84.225	82.45	40.23	2.12E+00	0.76	5.26E+01
86.225	82.45	40.23	2.17E+00	0.76	5.14E+01
88.225	82.45	40.23	2.22E+00	0.76	5.03E+01
90.225	82.44	40.24	2.27E+00	0.75	4.92E+01
92.225	82.44	40.24	2.32E+00	0.75	4.82E+01
94.225	82.44	40.24	2.37E+00	0.75	4.72E+01
96.225	82.42	40.26	2.42E+00	0.73	4.62E+01
98.225	82.42	40.26	2.48E+00	0.73	4.53E+01
100.230	82.41	40.27	2.53E+00	0.72	4.44E+01
120.230	82.37	40.31	3.03E+00	0.68	3.72E+01
140.230	82.34	40.34	3.53E+00	0.65	3.20E+01
160.230	82.30	40.38	4.04E+00	0.61	2.81E+01
180.220	82.28	40.40	4.54E+00	0.59	2.51E+01
200.220	82.25	40.43	5.05E+00	0.56	2.27E+01
220.220	82.22	40.46	5.55E+00	0.53	2.08E+01
240.220	82.21	40.47	6.05E+00	0.52	1.91E+01
260.220	82.20	40.48	6.56E+00	0.51	1.77E+01
280.120	82.18	40.50	7.06E+00	0.49	1.65E+01
300.120	82.17	40.51	7.56E+00	0.48	1.55E+01
320.120	82.15	40.53	8.07E+00	0.46	1.46E+01
340.200	82.12	40.56	8.57E+00	0.43	1.38E+01
360.220	82.12	40.56	9.08E+00	0.43	1.31E+01
380.220	82.11	40.57	9.58E+00	0.42	1.24E+01
400.220	82.09	40.59	1.01E+01	0.40	1.19E+01
420.220	82.08	40.60	1.06E+01	0.39	1.14E+01
440.220	82.07	40.61	1.11E+01	0.38	1.09E+01
460.220	82.05	40.63	1.16E+01	0.36	1.05E+01

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 (INPUT 1)
WELL MATERIAL: PVC
RADIUS: 0.166 FEET
STARTING WATER LEVEL: 81.690 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 122.680 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
480.220	82.04	40.64	1.21E+01	0.35	1.01E+01
500.220	82.04	40.64	1.26E+01	0.35	9.70E+00
520.220	82.02	40.66	1.31E+01	0.33	9.36E+00
540.220	82.01	40.67	1.36E+01	0.32	9.05E+00
560.200	82.01	40.67	1.41E+01	0.32	8.76E+00
580.200	81.99	40.69	1.46E+01	0.30	8.50E+00
600.200	81.99	40.69	1.51E+01	0.30	8.25E+00
620.200	81.98	40.70	1.56E+01	0.29	8.01E+00
640.200	81.97	40.71	1.61E+01	0.28	7.79E+00
660.200	81.97	40.71	1.66E+01	0.28	7.59E+00
680.220	81.95	40.73	1.71E+01	0.26	7.39E+00
700.220	81.95	40.73	1.76E+01	0.26	7.21E+00
720.220	81.95	40.73	1.82E+01	0.26	7.04E+00
740.220	81.94	40.74	1.87E+01	0.25	6.88E+00
760.170	81.92	40.76	1.92E+01	0.23	6.72E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 11 INPUT 2
RADIUS: 446.391 FEET
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 79.28 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
16:30	0.000	79.28	0.00	0.00E+00
16:30	0.084	79.28	0.00	2.93E-10
16:30	0.167	79.28	0.00	5.82E-10
16:30	0.251	79.28	0.00	8.75E-10
16:30	0.334	79.28	0.00	1.16E-09
16:30	0.417	79.28	0.00	1.45E-09
16:30	0.501	79.28	0.00	1.75E-09
16:30	0.584	79.28	0.00	2.04E-09
16:30	0.667	79.28	0.00	2.32E-09
16:30	0.751	79.28	0.00	2.62E-09
16:30	0.834	79.28	0.00	2.91E-09
16:30	0.917	79.28	0.00	3.20E-09
16:31	1.001	79.28	0.00	3.49E-09
16:31	1.391	79.28	0.00	4.85E-09
16:31	1.724	79.28	0.00	6.01E-09
16:32	2.058	79.28	0.00	7.17E-09
16:32	2.391	79.28	0.00	8.33E-09
16:32	2.724	79.28	0.00	9.49E-09
16:33	3.058	79.28	0.00	1.07E-08
16:33	3.391	79.28	0.00	1.18E-08
16:33	3.724	79.28	0.00	1.30E-08
16:34	4.058	79.28	0.00	1.41E-08
16:34	4.391	79.28	0.00	1.53E-08
16:34	4.724	79.28	0.00	1.65E-08
16:35	5.058	79.28	0.00	1.76E-08
16:35	5.391	79.28	0.00	1.88E-08
16:35	5.724	79.28	0.00	1.99E-08
16:36	6.058	79.28	0.00	2.11E-08
16:36	6.391	79.28	0.00	2.23E-08
16:36	6.724	79.28	0.00	2.34E-08
16:37	7.058	79.28	0.00	2.46E-08
16:37	7.391	79.28	0.00	2.58E-08
16:37	7.724	79.28	0.00	2.69E-08
16:38	8.058	79.28	0.00	2.81E-08
16:38	8.391	79.28	0.00	2.92E-08
16:38	8.724	79.28	0.00	3.04E-08
16:39	9.058	79.28	0.00	3.16E-08
16:39	9.391	79.28	0.00	3.27E-08
16:39	9.724	79.28	0.00	3.39E-08
16:40	10.058	79.28	0.00	3.51E-08

16:42	12.153	79.28	0.00	4.24E-08
16:44	14.153	79.28	0.00	4.93E-08
16:46	16.423	79.28	0.00	5.72E-08
16:48	18.762	79.28	0.00	6.54E-08
16:50	20.193	79.28	0.00	7.04E-08
16:52	22.193	79.28	0.00	7.73E-08
16:54	24.193	79.26	0.02	8.43E-08
16:56	26.193	79.28	0.00	9.13E-08
16:58	28.193	79.28	0.00	9.83E-08
17:00	30.193	79.28	0.00	1.05E-07
17:02	32.193	79.28	0.00	1.12E-07
17:04	34.158	79.29	-0.01	1.19E-07
17:06	36.158	79.28	0.00	1.26E-07
17:08	38.158	79.28	0.00	1.33E-07
17:10	40.158	79.28	0.00	1.40E-07
17:12	42.158	79.28	0.00	1.47E-07
17:14	44.158	79.28	0.00	1.54E-07
17:16	46.158	79.28	0.00	1.61E-07
17:18	48.158	79.29	-0.01	1.68E-07
17:20	50.158	79.29	-0.01	1.75E-07
17:22	52.158	79.29	-0.01	1.82E-07
17:24	54.158	79.29	-0.01	1.89E-07
17:26	56.158	79.29	-0.01	1.96E-07
17:28	58.158	79.29	-0.01	2.03E-07
17:30	60.158	79.29	-0.01	2.10E-07
17:32	62.247	79.29	-0.01	2.17E-07
17:34	64.135	79.29	-0.01	2.24E-07
17:36	66.135	79.31	-0.03	2.30E-07
17:38	68.135	79.31	-0.03	2.37E-07
17:40	70.135	79.31	-0.03	2.44E-07
17:42	72.135	79.31	-0.03	2.51E-07
17:44	74.135	79.31	-0.03	2.58E-07
17:46	76.135	79.31	-0.03	2.65E-07
17:48	78.135	79.31	-0.03	2.72E-07
17:50	80.782	79.31	-0.03	2.82E-07
17:52	82.182	79.32	-0.04	2.86E-07
17:54	84.070	79.32	-0.04	2.93E-07
17:56	86.070	79.32	-0.04	3.00E-07
17:58	88.070	79.32	-0.04	3.07E-07
18:00	90.070	79.34	-0.06	3.14E-07
18:02	92.070	79.34	-0.06	3.21E-07
18:04	94.070	79.34	-0.06	3.28E-07
18:06	96.070	79.34	-0.06	3.35E-07
18:08	98.115	79.35	-0.07	3.42E-07
18:10	100.120	79.35	-0.07	3.49E-07
18:30	120.280	79.37	-0.09	4.19E-07
18:50	140.220	79.37	-0.09	4.89E-07
19:10	160.220	79.38	-0.10	5.58E-07
19:30	180.220	79.41	-0.13	6.28E-07
20:10	220.500	79.45	-0.17	7.68E-07
20:30	240.270	79.48	-0.20	8.37E-07
20:50	260.330	79.50	-0.22	9.07E-07
21:10	280.330	79.51	-0.23	9.77E-07
21:30	300.230	79.53	-0.25	1.05E-06
21:50	320.280	79.56	-0.28	1.12E-06
22:10	340.320	79.56	-0.28	1.19E-06

22:30	360.300	79.57	-0.29	1.26E-06
22:50	380.270	79.58	-0.30	1.33E-06
23:10	400.270	79.58	-0.30	1.39E-06
23:30	420.270	79.60	-0.32	1.46E-06
23:50	440.270	79.60	-0.32	1.53E-06
00:10	460.270	79.60	-0.32	1.60E-06
00:30	480.270	79.61	-0.33	1.67E-06
00:50	500.270	79.61	-0.33	1.74E-06
01:10	520.270	79.63	-0.35	1.81E-06
01:30	540.220	79.63	-0.35	1.88E-06
01:50	560.230	79.64	-0.36	1.95E-06
02:10	580.230	79.64	-0.36	2.02E-06
02:30	600.230	79.64	-0.36	2.09E-06
02:50	620.230	79.66	-0.38	2.16E-06
03:10	640.230	79.66	-0.38	2.23E-06
03:30	660.230	79.66	-0.38	2.30E-06
03:50	680.230	79.67	-0.39	2.37E-06
04:10	700.180	79.67	-0.39	2.44E-06
04:30	720.320	79.67	-0.39	2.51E-06
04:50	740.280	79.69	-0.41	2.58E-06
05:10	760.280	79.69	-0.41	2.65E-06
05:30	780.280	79.69	-0.41	2.72E-06
05:50	800.320	79.70	-0.42	2.79E-06
06:10	820.320	79.70	-0.42	2.86E-06
06:30	840.320	79.70	-0.42	2.93E-06
06:50	860.320	79.70	-0.42	3.00E-06
07:10	880.320	79.72	-0.44	3.07E-06
07:30	900.320	79.72	-0.44	3.14E-06
07:50	920.320	79.72	-0.44	3.21E-06
08:10	940.320	79.73	-0.45	3.28E-06
08:30	960.320	79.73	-0.45	3.35E-06
08:50	980.320	79.74	-0.46	3.42E-06
10:10	1060.500	79.76	-0.48	3.70E-06
11:10	1120.200	79.77	-0.49	3.90E-06
12:10	1180.200	79.77	-0.49	4.11E-06
13:10	1240.200	79.77	-0.49	4.32E-06
14:10	1300.200	79.79	-0.51	4.53E-06
15:10	1360.200	79.80	-0.52	4.74E-06
16:10	1420.200	79.80	-0.52	4.95E-06
17:10	1480.200	79.80	-0.52	5.16E-06
18:10	1540.100	79.80	-0.52	5.37E-06
19:10	1600.300	79.79	-0.51	5.58E-06
20:10	1660.300	79.79	-0.51	5.79E-06
21:10	1720.300	79.80	-0.52	6.00E-06
22:10	1780.200	79.82	-0.54	6.20E-06
23:10	1840.200	79.80	-0.52	6.41E-06
00:10	1900.200	79.82	-0.54	6.62E-06
01:10	1960.300	79.82	-0.54	6.83E-06
02:10	2020.300	79.82	-0.54	7.04E-06
03:10	2080.200	79.82	-0.54	7.25E-06
04:10	2140.200	79.83	-0.55	7.46E-06
05:10	2200.200	79.83	-0.55	7.67E-06
06:10	2260.200	79.83	-0.55	7.88E-06
07:10	2320.200	79.83	-0.55	8.09E-06
08:10	2380.300	79.83	-0.55	8.30E-06
09:10	2440.200	79.83	-0.55	8.50E-06

10:10	2500.300	79.85	-0.57	8.71E-06
11:10	2560.300	79.85	-0.57	8.92E-06
12:10	2620.300	79.85	-0.57	9.13E-06
13:10	2680.300	79.83	-0.55	9.34E-06
14:10	2740.200	79.83	-0.55	9.55E-06
15:10	2800.200	79.83	-0.55	9.76E-06
16:10	2860.300	79.82	-0.54	9.97E-06
17:10	2920.200	79.82	-0.54	1.02E-05
18:10	2980.200	79.80	-0.52	1.04E-05
19:10	3040.200	79.80	-0.52	1.06E-05
20:10	3100.200	79.80	-0.52	1.08E-05
21:10	3160.200	79.80	-0.52	1.10E-05
22:10	3220.200	79.82	-0.54	1.12E-05
23:10	3280.200	79.82	-0.54	1.14E-05
00:10	3340.200	79.83	-0.55	1.16E-05
01:10	3400.200	79.83	-0.55	1.18E-05
02:10	3460.200	79.83	-0.55	1.21E-05
03:10	3520.200	79.85	-0.57	1.23E-05
04:10	3580.200	79.85	-0.57	1.25E-05
05:10	3640.200	79.85	-0.57	1.27E-05
06:10	3700.200	79.85	-0.57	1.29E-05
07:10	3760.400	79.85	-0.57	1.31E-05
08:10	3820.200	79.86	-0.58	1.33E-05
09:10	3880.200	79.86	-0.58	1.35E-05
10:10	3940.200	79.88	-0.60	1.37E-05
11:10	4000.200	79.89	-0.61	1.39E-05
12:10	4060.300	79.90	-0.62	1.42E-05
13:10	4120.200	79.90	-0.62	1.44E-05
14:10	4180.200	79.92	-0.64	1.46E-05
15:10	4240.300	79.92	-0.64	1.48E-05
16:10	4300.200	79.92	-0.64	1.50E-05
16:59	4349.700	79.95	-0.67	1.52E-05

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 11 (INPUT 2)
WELL MATERIAL: PVC
RADIUS: 446.391 FEET
STARTING WATER LEVEL: 79.280 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 79.950 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
0.084	79.95	0.00	2.93E-10	0.67	5.18E+04
0.167	79.95	0.00	5.82E-10	0.67	2.60E+04
0.251	79.95	0.00	8.75E-10	0.67	1.73E+04
0.334	79.95	0.00	1.16E-09	0.67	1.30E+04
0.417	79.95	0.00	1.45E-09	0.67	1.04E+04
0.501	79.95	0.00	1.75E-09	0.67	8.68E+03
0.584	79.95	0.00	2.04E-09	0.67	7.45E+03
0.667	79.95	0.00	2.32E-09	0.67	6.52E+03
0.751	79.93	0.02	2.62E-09	0.65	5.79E+03
0.834	79.93	0.02	2.91E-09	0.65	5.22E+03
0.917	79.95	0.00	3.20E-09	0.67	4.74E+03
1.001	79.93	0.02	3.49E-09	0.65	4.35E+03
1.389	79.93	0.02	4.84E-09	0.65	3.13E+03
1.723	79.95	0.00	6.00E-09	0.67	2.53E+03
2.056	79.95	0.00	7.17E-09	0.67	2.12E+03
2.389	79.95	0.00	8.33E-09	0.67	1.82E+03
2.723	79.95	0.00	9.49E-09	0.67	1.60E+03
3.056	79.95	0.00	1.07E-08	0.67	1.42E+03
3.389	79.95	0.00	1.18E-08	0.67	1.28E+03
3.723	79.95	0.00	1.30E-08	0.67	1.17E+03
4.056	79.95	0.00	1.41E-08	0.67	1.07E+03
4.389	79.95	0.00	1.53E-08	0.67	9.92E+02
4.723	79.95	0.00	1.65E-08	0.67	9.22E+02
5.056	79.95	0.00	1.76E-08	0.67	8.61E+02
5.389	79.95	0.00	1.88E-08	0.67	8.08E+02
5.723	79.93	0.02	1.99E-08	0.65	7.61E+02
6.056	79.93	0.02	2.11E-08	0.65	7.19E+02
6.389	79.93	0.02	2.23E-08	0.65	6.82E+02
6.723	79.93	0.02	2.34E-08	0.65	6.48E+02
7.056	79.95	0.00	2.46E-08	0.67	6.17E+02
7.389	79.93	0.02	2.58E-08	0.65	5.90E+02
7.723	79.95	0.00	2.69E-08	0.67	5.64E+02
8.056	79.95	0.00	2.81E-08	0.67	5.41E+02
8.389	79.95	0.00	2.92E-08	0.67	5.20E+02

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 11 (INPUT 2)
WELL MATERIAL: PVC
RADIUS: 446.391 FEET
STARTING WATER LEVEL: 79.280 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 79.950 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
8.723	79.95	0.00	3.04E-08	0.67	5.00E+02
9.056	79.95	0.00	3.16E-08	0.67	4.81E+02
9.389	79.93	0.02	3.27E-08	0.65	4.64E+02
9.723	79.95	0.00	3.39E-08	0.67	4.48E+02
10.056	79.93	0.02	3.50E-08	0.65	4.34E+02
12.165	79.95	0.00	4.24E-08	0.67	3.59E+02
14.495	79.95	0.00	5.05E-08	0.67	3.01E+02
16.165	79.93	0.02	5.63E-08	0.65	2.70E+02
18.165	79.95	0.00	6.33E-08	0.67	2.40E+02
20.203	79.93	0.02	7.04E-08	0.65	2.16E+02
22.203	79.93	0.02	7.74E-08	0.65	1.97E+02
24.225	79.93	0.02	8.44E-08	0.65	1.81E+02
26.225	79.93	0.02	9.14E-08	0.65	1.67E+02
28.225	79.93	0.02	9.84E-08	0.65	1.55E+02
30.225	79.93	0.02	1.05E-07	0.65	1.45E+02
32.225	79.93	0.02	1.12E-07	0.65	1.36E+02
34.225	79.93	0.02	1.19E-07	0.65	1.28E+02
36.225	79.93	0.02	1.26E-07	0.65	1.21E+02
38.225	79.93	0.02	1.33E-07	0.65	1.15E+02
40.225	79.93	0.02	1.40E-07	0.65	1.09E+02
42.225	79.93	0.02	1.47E-07	0.65	1.04E+02
44.225	79.93	0.02	1.54E-07	0.65	9.94E+01
46.225	79.93	0.02	1.61E-07	0.65	9.51E+01
48.225	79.93	0.02	1.68E-07	0.65	9.12E+01
50.225	79.93	0.02	1.75E-07	0.65	8.76E+01
52.225	79.92	0.03	1.82E-07	0.64	8.43E+01
54.225	79.93	0.02	1.89E-07	0.65	8.12E+01
56.225	79.92	0.03	1.96E-07	0.64	7.84E+01
58.225	79.92	0.03	2.03E-07	0.64	7.57E+01
60.225	79.92	0.03	2.10E-07	0.64	7.32E+01
62.225	79.92	0.03	2.17E-07	0.64	7.09E+01
64.225	79.92	0.03	2.24E-07	0.64	6.87E+01
66.225	79.92	0.03	2.31E-07	0.64	6.67E+01
68.225	79.90	0.05	2.38E-07	0.62	6.48E+01

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 7 INPUT 3
RADIUS: 682.670 FEET
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 81.17 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
16:30	0.000	81.17	0.00	0.00E+00
16:30	0.084	81.17	0.00	1.25E-10
16:30	0.167	81.17	0.00	2.49E-10
16:30	0.251	81.17	0.00	3.74E-10
16:30	0.334	81.17	0.00	4.98E-10
16:30	0.417	81.17	0.00	6.21E-10
16:30	0.501	81.17	0.00	7.47E-10
16:30	0.584	81.17	0.00	8.70E-10
16:30	0.667	81.17	0.00	9.94E-10
16:30	0.751	81.17	0.00	1.12E-09
16:30	0.834	81.17	0.00	1.24E-09
16:30	0.917	81.17	0.00	1.37E-09
16:31	1.001	81.17	0.00	1.49E-09
16:31	1.391	81.17	0.00	2.07E-09
16:31	1.724	81.17	0.00	2.57E-09
16:32	2.058	81.17	0.00	3.07E-09
16:32	2.391	81.17	0.00	3.56E-09
16:32	2.724	81.17	0.00	4.06E-09
16:33	3.058	81.17	0.00	4.56E-09
16:33	3.391	81.17	0.00	5.05E-09
16:33	3.724	81.17	0.00	5.55E-09
16:34	4.058	81.17	0.00	6.05E-09
16:34	4.391	81.17	0.00	6.54E-09
16:34	4.724	81.17	0.00	7.04E-09
16:35	5.058	81.17	0.00	7.54E-09
16:35	5.391	81.17	0.00	8.03E-09
16:35	5.724	81.17	0.00	8.53E-09
16:36	6.058	81.17	0.00	9.03E-09
16:36	6.391	81.18	-0.01	9.52E-09
16:36	6.724	81.17	0.00	1.00E-08
16:37	7.058	81.17	0.00	1.05E-08
16:37	7.391	81.17	0.00	1.10E-08
16:37	7.724	81.17	0.00	1.15E-08
16:38	8.058	81.17	0.00	1.20E-08
16:38	8.391	81.16	0.01	1.25E-08
16:38	8.724	81.16	0.01	1.30E-08
16:39	9.058	81.16	0.01	1.35E-08
16:39	9.391	81.17	0.00	1.40E-08
16:39	9.724	81.18	-0.01	1.45E-08
16:40	10.058	81.17	0.00	1.50E-08

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 11 (INPUT 2)
WELL MATERIAL: PVC
RADIUS: 446.391 FEET
STARTING WATER LEVEL: 79.280 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 79.950 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
70.225	79.90	0.05	2.45E-07	0.62	6.29E+01
72.225	79.90	0.05	2.52E-07	0.62	6.12E+01
74.225	79.90	0.05	2.59E-07	0.62	5.96E+01
76.225	79.90	0.05	2.66E-07	0.62	5.81E+01
78.225	79.89	0.06	2.73E-07	0.61	5.66E+01
80.225	79.89	0.06	2.80E-07	0.61	5.52E+01
82.225	79.89	0.06	2.87E-07	0.61	5.39E+01
84.225	79.89	0.06	2.94E-07	0.61	5.26E+01
86.225	79.89	0.06	3.00E-07	0.61	5.14E+01
88.225	79.89	0.06	3.07E-07	0.61	5.03E+01
90.225	79.88	0.07	3.14E-07	0.60	4.92E+01
92.225	79.88	0.07	3.21E-07	0.60	4.82E+01
94.225	79.88	0.07	3.28E-07	0.60	4.72E+01
96.225	79.88	0.07	3.35E-07	0.60	4.62E+01
98.225	79.88	0.07	3.42E-07	0.60	4.53E+01
100.230	79.88	0.07	3.49E-07	0.60	4.44E+01
120.230	79.85	0.10	4.19E-07	0.57	3.72E+01
140.230	79.82	0.13	4.89E-07	0.54	3.20E+01
160.230	79.79	0.16	5.58E-07	0.51	2.81E+01
180.220	79.77	0.18	6.28E-07	0.49	2.51E+01
200.220	79.74	0.21	6.98E-07	0.46	2.27E+01
220.220	79.73	0.22	7.67E-07	0.45	2.08E+01
240.220	79.72	0.23	8.37E-07	0.44	1.91E+01
260.220	79.70	0.25	9.07E-07	0.42	1.77E+01
280.120	79.69	0.26	9.76E-07	0.41	1.65E+01
300.120	79.67	0.28	1.05E-06	0.39	1.55E+01
320.120	79.66	0.29	1.12E-06	0.38	1.46E+01
340.200	79.64	0.31	1.19E-06	0.36	1.38E+01
360.220	79.63	0.32	1.26E-06	0.35	1.31E+01
380.220	79.61	0.34	1.33E-06	0.33	1.24E+01
400.220	79.60	0.35	1.39E-06	0.32	1.19E+01
420.220	79.58	0.37	1.46E-06	0.30	1.14E+01
440.220	79.58	0.37	1.53E-06	0.30	1.09E+01
460.220	79.57	0.38	1.60E-06	0.29	1.05E+01

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 11 (INPUT 2)
WELL MATERIAL: PVC
RADIUS: 446.391 FEET
STARTING WATER LEVEL: 79.280 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 79.950 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
480.220	79.56	0.39	1.67E-06	0.28	1.01E+01
500.220	79.56	0.39	1.74E-06	0.28	9.70E+00
520.220	79.54	0.41	1.81E-06	0.26	9.36E+00
540.220	79.54	0.41	1.88E-06	0.26	9.05E+00
560.200	79.53	0.42	1.95E-06	0.25	8.76E+00
580.200	79.53	0.42	2.02E-06	0.25	8.50E+00
600.200	79.51	0.44	2.09E-06	0.23	8.25E+00
620.200	79.51	0.44	2.16E-06	0.23	8.01E+00
640.200	79.51	0.44	2.23E-06	0.23	7.79E+00
660.200	79.50	0.45	2.30E-06	0.22	7.59E+00
680.220	79.50	0.45	2.37E-06	0.22	7.39E+00
700.220	79.48	0.47	2.44E-06	0.20	7.21E+00
720.220	79.48	0.47	2.51E-06	0.20	7.04E+00
740.220	79.47	0.48	2.58E-06	0.19	6.88E+00
760.170	79.47	0.48	2.65E-06	0.19	6.72E+00
780.080	79.45	0.50	2.72E-06	0.17	6.58E+00
800.080	79.45	0.50	2.79E-06	0.17	6.44E+00
820.080	79.45	0.50	2.86E-06	0.17	6.30E+00
840.080	79.45	0.50	2.93E-06	0.17	6.18E+00
860.070	79.45	0.50	3.00E-06	0.17	6.06E+00
880.170	79.44	0.51	3.07E-06	0.16	5.94E+00
900.170	79.44	0.51	3.14E-06	0.16	5.83E+00
920.170	79.44	0.51	3.21E-06	0.16	5.73E+00
940.130	79.45	0.50	3.28E-06	0.17	5.63E+00
954.580	79.44	0.51	3.33E-06	0.16	5.56E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 7 INPUT 3
RADIUS: 682.670 FEET
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 81.17 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
16:30	0.000	81.17	0.00	0.00E+00
16:30	0.084	81.17	0.00	1.25E-10
16:30	0.167	81.17	0.00	2.49E-10
16:30	0.251	81.17	0.00	3.74E-10
16:30	0.334	81.17	0.00	4.98E-10
16:30	0.417	81.17	0.00	6.21E-10
16:30	0.501	81.17	0.00	7.47E-10
16:30	0.584	81.17	0.00	8.70E-10
16:30	0.667	81.17	0.00	9.94E-10
16:30	0.751	81.17	0.00	1.12E-09
16:30	0.834	81.17	0.00	1.24E-09
16:30	0.917	81.17	0.00	1.37E-09
16:31	1.001	81.17	0.00	1.49E-09
16:31	1.391	81.17	0.00	2.07E-09
16:31	1.724	81.17	0.00	2.57E-09
16:32	2.058	81.17	0.00	3.07E-09
16:32	2.391	81.17	0.00	3.56E-09
16:32	2.724	81.17	0.00	4.06E-09
16:33	3.058	81.17	0.00	4.56E-09
16:33	3.391	81.17	0.00	5.05E-09
16:33	3.724	81.17	0.00	5.55E-09
16:34	4.058	81.17	0.00	6.05E-09
16:34	4.391	81.17	0.00	6.54E-09
16:34	4.724	81.17	0.00	7.04E-09
16:35	5.058	81.17	0.00	7.54E-09
16:35	5.391	81.17	0.00	8.03E-09
16:35	5.724	81.17	0.00	8.53E-09
16:36	6.058	81.17	0.00	9.03E-09
16:36	6.391	81.18	-0.01	9.52E-09
16:36	6.724	81.17	0.00	1.00E-08
16:37	7.058	81.17	0.00	1.05E-08
16:37	7.391	81.17	0.00	1.10E-08
16:37	7.724	81.17	0.00	1.15E-08
16:38	8.058	81.17	0.00	1.20E-08
16:38	8.391	81.16	0.01	1.25E-08
16:38	8.724	81.16	0.01	1.30E-08
16:39	9.058	81.16	0.01	1.35E-08
16:39	9.391	81.17	0.00	1.40E-08
16:39	9.724	81.18	-0.01	1.45E-08
16:40	10.058	81.17	0.00	1.50E-08

16:42	12.153	81.18	-0.01	1.81E-08
16:44	14.153	81.17	0.00	2.11E-08
16:46	16.423	81.17	0.00	2.45E-08
16:48	18.762	81.17	0.00	2.80E-08
16:50	20.193	81.17	0.00	3.01E-08
16:52	22.193	81.17	0.00	3.31E-08
16:54	24.193	81.17	0.00	3.61E-08
16:56	26.193	81.17	0.00	3.90E-08
16:58	28.193	81.17	0.00	4.20E-08
17:00	30.193	81.18	-0.01	4.50E-08
17:02	32.193	81.17	0.00	4.80E-08
17:04	34.158	81.17	0.00	5.09E-08
17:06	36.158	81.17	0.00	5.39E-08
17:08	38.158	81.17	0.00	5.69E-08
17:10	40.158	81.17	0.00	5.98E-08
17:12	42.158	81.17	0.00	6.28E-08
17:14	44.158	81.17	0.00	6.58E-08
17:16	46.158	81.17	0.00	6.88E-08
17:18	48.158	81.17	0.00	7.18E-08
17:20	50.158	81.17	0.00	7.47E-08
17:22	52.158	81.17	0.00	7.77E-08
17:24	54.158	81.17	0.00	8.07E-08
17:26	56.158	81.17	0.00	8.37E-08
17:28	58.158	81.17	0.00	8.67E-08
17:30	60.158	81.17	0.00	8.96E-08
17:32	62.247	81.17	0.00	9.28E-08
17:34	64.135	81.17	0.00	9.56E-08
17:36	66.135	81.17	0.00	9.85E-08
17:38	68.135	81.17	0.00	1.02E-07
17:40	70.135	81.17	0.00	1.05E-07
17:42	72.135	81.17	0.00	1.07E-07
17:44	74.135	81.17	0.00	1.10E-07
17:46	76.135	81.17	0.00	1.13E-07
17:48	78.135	81.17	0.00	1.16E-07
17:50	80.782	81.17	0.00	1.20E-07
17:52	82.182	81.17	0.00	1.22E-07
17:54	84.070	81.17	0.00	1.25E-07
17:56	86.070	81.17	0.00	1.28E-07
17:58	88.070	81.17	0.00	1.31E-07
18:00	90.070	81.17	0.00	1.34E-07
18:02	92.070	81.17	0.00	1.37E-07
18:04	94.070	81.17	0.00	1.40E-07
18:06	96.070	81.17	0.00	1.43E-07
18:08	98.115	81.17	0.00	1.46E-07
18:10	100.120	81.17	0.00	1.49E-07
18:30	120.280	81.17	0.00	1.79E-07
18:50	140.220	81.17	0.00	2.09E-07
19:10	160.220	81.15	0.02	2.39E-07
19:30	180.220	81.15	0.02	2.69E-07
20:10	220.500	81.16	0.01	3.29E-07
20:30	240.270	81.16	0.01	3.58E-07
20:50	260.330	81.16	0.01	3.88E-07
21:10	280.330	81.16	0.01	4.18E-07
21:30	300.230	81.16	0.01	4.47E-07
21:50	320.280	81.16	0.01	4.77E-07
22:10	340.320	81.17	0.00	5.07E-07

22:30	360.300	81.17	0.00	5.37E-07
22:50	380.270	81.17	0.00	5.67E-07
23:10	400.270	81.17	0.00	5.96E-07
23:30	420.270	81.17	0.00	6.26E-07
23:50	440.270	81.17	0.00	6.56E-07
00:10	460.270	81.17	0.00	6.86E-07
00:30	480.270	81.17	0.00	7.16E-07
00:50	500.270	81.18	-0.01	7.45E-07
01:10	520.270	81.18	-0.01	7.75E-07
01:30	540.220	81.18	-0.01	8.05E-07
01:50	560.230	81.18	-0.01	8.35E-07
02:10	580.230	81.18	-0.01	8.65E-07
02:30	600.230	81.19	-0.02	8.94E-07
02:50	620.230	81.19	-0.02	9.24E-07
03:10	640.230	81.19	-0.02	9.54E-07
03:30	660.230	81.19	-0.02	9.84E-07
03:50	680.230	81.19	-0.02	1.01E-06
04:10	700.180	81.19	-0.02	1.04E-06
04:30	720.320	81.19	-0.02	1.07E-06
04:50	740.280	81.19	-0.02	1.10E-06
05:10	760.280	81.19	-0.02	1.13E-06
05:30	780.280	81.19	-0.02	1.16E-06
05:50	800.320	81.20	-0.03	1.19E-06
06:10	820.320	81.19	-0.02	1.22E-06
06:30	840.320	81.20	-0.03	1.25E-06
06:50	860.320	81.20	-0.03	1.28E-06
07:10	880.320	81.20	-0.03	1.31E-06
07:30	900.320	81.20	-0.03	1.34E-06
07:50	920.320	81.20	-0.03	1.37E-06
08:10	940.320	81.21	-0.04	1.40E-06
08:30	960.320	81.21	-0.04	1.43E-06
08:50	980.320	81.21	-0.04	1.46E-06
10:10	1060.500	81.22	-0.05	1.58E-06
11:10	1120.200	81.23	-0.06	1.67E-06
12:10	1180.200	81.23	-0.06	1.76E-06
13:10	1240.200	81.23	-0.06	1.85E-06
14:10	1300.200	81.24	-0.07	1.94E-06
15:10	1360.200	81.24	-0.07	2.03E-06
16:10	1420.200	81.24	-0.07	2.12E-06
17:10	1480.200	81.24	-0.07	2.21E-06
18:10	1540.100	81.25	-0.08	2.29E-06
19:10	1600.300	81.25	-0.08	2.38E-06
20:10	1660.300	81.25	-0.08	2.47E-06
21:10	1720.300	81.26	-0.09	2.56E-06
22:10	1780.200	81.26	-0.09	2.65E-06
23:10	1840.200	81.27	-0.10	2.74E-06
00:10	1900.200	81.27	-0.10	2.83E-06
01:10	1960.300	81.28	-0.11	2.92E-06
02:10	2020.300	81.28	-0.11	3.01E-06
03:10	2080.200	81.29	-0.12	3.10E-06
04:10	2140.200	81.29	-0.12	3.19E-06
05:10	2200.200	81.28	-0.11	3.28E-06
06:10	2260.200	81.28	-0.11	3.37E-06
07:10	2320.200	81.28	-0.11	3.46E-06
08:10	2380.300	81.27	-0.10	3.55E-06
09:10	2440.200	81.26	-0.09	3.64E-06

10:10	2500.300	81.26	-0.09	3.73E-06
11:10	2560.300	81.26	-0.09	3.82E-06
12:10	2620.300	81.25	-0.08	3.90E-06
13:10	2680.300	81.23	-0.06	3.99E-06
14:10	2740.200	81.23	-0.06	4.08E-06
15:10	2800.200	81.23	-0.06	4.17E-06
16:10	2860.300	81.23	-0.06	4.26E-06
17:10	2920.200	81.23	-0.06	4.35E-06
18:10	2980.200	81.23	-0.06	4.44E-06
19:10	3040.200	81.23	-0.06	4.53E-06
20:10	3100.200	81.23	-0.06	4.62E-06
21:10	3160.200	81.24	-0.07	4.71E-06
22:10	3220.200	81.24	-0.07	4.80E-06
23:10	3280.200	81.24	-0.07	4.89E-06
00:10	3340.200	81.24	-0.07	4.98E-06
01:10	3400.200	81.24	-0.07	5.07E-06
02:10	3460.200	81.24	-0.07	5.16E-06
03:10	3520.200	81.24	-0.07	5.25E-06
04:10	3580.200	81.24	-0.07	5.33E-06
05:10	3640.200	81.25	-0.08	5.42E-06
06:10	3700.200	81.25	-0.08	5.51E-06
07:10	3760.400	81.25	-0.08	5.60E-06
08:10	3820.200	81.25	-0.08	5.69E-06
09:10	3880.200	81.25	-0.08	5.78E-06
10:10	3940.200	81.25	-0.08	5.87E-06
11:10	4000.200	81.26	-0.09	5.96E-06
12:10	4060.300	81.26	-0.09	6.05E-06
13:10	4120.200	81.26	-0.09	6.14E-06
14:10	4180.200	81.27	-0.10	6.23E-06
15:10	4240.300	81.27	-0.10	6.32E-06
16:10	4300.200	81.27	-0.10	6.41E-06
16:59	4349.700	81.27	-0.10	6.48E-06

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 (INPUT 3)
WELL MATERIAL: PVC
RADIUS: 682.670 FEET
STARTING WATER LEVEL: 81.170 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 81.270 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
0.084	81.28	-0.01	1.25E-10	0.11	5.18E+04
0.167	81.27	0.00	2.49E-10	0.10	2.60E+04
0.251	81.27	0.00	3.74E-10	0.10	1.73E+04
0.334	81.27	0.00	4.98E-10	0.10	1.30E+04
0.417	81.27	0.00	6.21E-10	0.10	1.04E+04
0.501	81.28	-0.01	7.47E-10	0.11	8.68E+03
0.584	81.28	-0.01	8.70E-10	0.11	7.45E+03
0.667	81.28	-0.01	9.94E-10	0.11	6.52E+03
0.751	81.27	0.00	1.12E-09	0.10	5.79E+03
0.834	81.27	0.00	1.24E-09	0.10	5.22E+03
0.917	81.27	0.00	1.37E-09	0.10	4.74E+03
1.001	81.27	0.00	1.49E-09	0.10	4.35E+03
1.389	81.27	0.00	2.07E-09	0.10	3.13E+03
1.723	81.27	0.00	2.57E-09	0.10	2.53E+03
2.056	81.27	0.00	3.06E-09	0.10	2.12E+03
2.389	81.27	0.00	3.56E-09	0.10	1.82E+03
2.723	81.27	0.00	4.06E-09	0.10	1.60E+03
3.056	81.27	0.00	4.55E-09	0.10	1.42E+03
3.389	81.27	0.00	5.05E-09	0.10	1.28E+03
3.723	81.27	0.00	5.55E-09	0.10	1.17E+03
4.056	81.28	-0.01	6.04E-09	0.11	1.07E+03
4.389	81.27	0.00	6.54E-09	0.10	9.92E+02
4.723	81.27	0.00	7.04E-09	0.10	9.22E+02
5.056	81.27	0.00	7.53E-09	0.10	8.61E+02
5.389	81.27	0.00	8.03E-09	0.10	8.08E+02
5.723	81.27	0.00	8.53E-09	0.10	7.61E+02
6.056	81.27	0.00	9.02E-09	0.10	7.19E+02
6.389	81.27	0.00	9.52E-09	0.10	6.82E+02
6.723	81.27	0.00	1.00E-08	0.10	6.48E+02
7.056	81.27	0.00	1.05E-08	0.10	6.17E+02
7.389	81.27	0.00	1.10E-08	0.10	5.90E+02
7.723	81.27	0.00	1.15E-08	0.10	5.64E+02
8.056	81.27	0.00	1.20E-08	0.10	5.41E+02
8.389	81.27	0.00	1.25E-08	0.10	5.20E+02

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 (INPUT 3)
WELL MATERIAL: PVC
RADIUS: 682.670 FEET
STARTING WATER LEVEL: 81.170 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 81.270 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
8.723	81.27	0.00	1.30E-08	0.10	5.00E+02
9.056	81.27	0.00	1.35E-08	0.10	4.81E+02
9.389	81.27	0.00	1.40E-08	0.10	4.64E+02
9.723	81.27	0.00	1.45E-08	0.10	4.48E+02
10.056	81.27	0.00	1.50E-08	0.10	4.34E+02
12.165	81.27	0.00	1.81E-08	0.10	3.59E+02
14.495	81.27	0.00	2.16E-08	0.10	3.01E+02
16.165	81.27	0.00	2.41E-08	0.10	2.70E+02
18.165	81.27	0.00	2.71E-08	0.10	2.40E+02
20.203	81.27	0.00	3.01E-08	0.10	2.16E+02
22.203	81.27	0.00	3.31E-08	0.10	1.97E+02
24.225	81.27	0.00	3.61E-08	0.10	1.81E+02
26.225	81.28	-0.01	3.91E-08	0.11	1.67E+02
28.225	81.27	0.00	4.21E-08	0.10	1.55E+02
30.225	81.27	0.00	4.50E-08	0.10	1.45E+02
32.225	81.27	0.00	4.80E-08	0.10	1.36E+02
34.225	81.28	-0.01	5.10E-08	0.11	1.28E+02
36.225	81.27	0.00	5.40E-08	0.10	1.21E+02
38.225	81.27	0.00	5.70E-08	0.10	1.15E+02
40.225	81.27	0.00	5.99E-08	0.10	1.09E+02
42.225	81.27	0.00	6.29E-08	0.10	1.04E+02
44.225	81.27	0.00	6.59E-08	0.10	9.94E+01
46.225	81.27	0.00	6.89E-08	0.10	9.51E+01
48.225	81.27	0.00	7.19E-08	0.10	9.12E+01
50.225	81.27	0.00	7.48E-08	0.10	8.76E+01
52.225	81.27	0.00	7.78E-08	0.10	8.43E+01
54.225	81.27	0.00	8.08E-08	0.10	8.12E+01
56.225	81.27	0.00	8.38E-08	0.10	7.84E+01
58.225	81.27	0.00	8.68E-08	0.10	7.57E+01
60.225	81.27	0.00	8.97E-08	0.10	7.32E+01
62.225	81.27	0.00	9.27E-08	0.10	7.09E+01
64.225	81.27	0.00	9.57E-08	0.10	6.87E+01
66.225	81.27	0.00	9.87E-08	0.10	6.67E+01
68.225	81.27	0.00	1.02E-07	0.10	6.48E+01

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 (INPUT 3)
WELL MATERIAL: PVC
RADIUS: 682.670 FEET
STARTING WATER LEVEL: 81.170 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 81.270 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
70.225	81.27	0.00	1.05E-07	0.10	6.29E+01
72.225	81.27	0.00	1.08E-07	0.10	6.12E+01
74.225	81.27	0.00	1.11E-07	0.10	5.96E+01
76.225	81.27	0.00	1.14E-07	0.10	5.81E+01
78.225	81.27	0.00	1.17E-07	0.10	5.66E+01
80.225	81.27	0.00	1.20E-07	0.10	5.52E+01
82.225	81.27	0.00	1.23E-07	0.10	5.39E+01
84.225	81.27	0.00	1.26E-07	0.10	5.26E+01
86.225	81.27	0.00	1.28E-07	0.10	5.14E+01
88.225	81.27	0.00	1.31E-07	0.10	5.03E+01
90.225	*	*	1.34E-07	*	4.92E+01
92.225	*	*	1.37E-07	*	4.82E+01
94.225	*	*	1.40E-07	*	4.72E+01
96.225	*	*	1.43E-07	*	4.62E+01
98.225	*	*	1.46E-07	*	4.53E+01
100.230	*	*	1.49E-07	*	4.44E+01
120.230	*	*	1.79E-07	*	3.72E+01
140.230	*	*	2.09E-07	*	3.20E+01
160.230	*	*	2.39E-07	*	2.81E+01
180.220	*	*	2.69E-07	*	2.51E+01
200.220	*	*	2.98E-07	*	2.27E+01
220.220	91.02	-9.75	3.28E-07	9.85	2.08E+01
240.220	91.03	-9.76	3.58E-07	9.86	1.91E+01
260.220	91.03	-9.76	3.88E-07	9.86	1.77E+01
280.120	91.03	-9.76	4.17E-07	9.86	1.65E+01
300.120	91.03	-9.76	4.47E-07	9.86	1.55E+01
320.120	91.03	-9.76	4.77E-07	9.86	1.46E+01
340.200	91.03	-9.76	5.07E-07	9.86	1.38E+01
360.220	91.03	-9.76	5.37E-07	9.86	1.31E+01
380.220	91.03	-9.76	5.67E-07	9.86	1.24E+01
400.220	91.03	-9.76	5.96E-07	9.86	1.19E+01
420.220	91.03	-9.76	6.26E-07	9.86	1.14E+01
440.220	91.03	-9.76	6.56E-07	9.86	1.09E+01
460.220	91.03	-9.76	6.86E-07	9.86	1.05E+01

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 3-4 RUN #2
TEST DATE: 8/21/86
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 (INPUT 3)
WELL MATERIAL: PVC
RADIUS: 682.670 FEET
STARTING WATER LEVEL: 81.170 FEET
PUMPING TIME: 4349.7 MIN
STOPPING WATER LEVEL: 81.270 FEET

ELAPSED TIME (MIN)	WATER LEVEL (FEET)	HEAD RECOVERY (FEET)	t/r2	RESIDUAL DRAWDOWN (FEET)	t/t'
480.220	91.03	-9.76	7.16E-07	9.86	1.01E+01
500.220	91.03	-9.76	7.45E-07	9.86	9.70E+00
520.220	91.03	-9.76	7.75E-07	9.86	9.36E+00
540.220	91.03	-9.76	8.05E-07	9.86	9.05E+00
560.200	91.03	-9.76	8.35E-07	9.86	8.76E+00
580.200	91.03	-9.76	8.65E-07	9.86	8.50E+00
600.200	91.03	-9.76	8.94E-07	9.86	8.25E+00
620.200	91.03	-9.76	9.24E-07	9.86	8.01E+00
640.200	91.03	-9.76	9.54E-07	9.86	7.79E+00
660.200	91.03	-9.76	9.84E-07	9.86	7.59E+00
680.220	91.03	-9.76	1.01E-06	9.86	7.39E+00
700.220	91.03	-9.76	1.04E-06	9.86	7.21E+00
720.220	91.03	-9.76	1.07E-06	9.86	7.04E+00
740.220	91.03	-9.76	1.10E-06	9.86	6.88E+00
760.170	91.03	-9.76	1.13E-06	9.86	6.72E+00
780.080	91.03	-9.76	1.16E-06	9.86	6.58E+00
800.080	91.03	-9.76	1.19E-06	9.86	6.44E+00
820.080	91.03	-9.76	1.22E-06	9.86	6.30E+00
840.080	91.03	-9.76	1.25E-06	9.86	6.18E+00
860.070	91.03	-9.76	1.28E-06	9.86	6.06E+00
880.170	91.03	-9.76	1.31E-06	9.86	5.94E+00
900.170	91.03	-9.76	1.34E-06	9.86	5.83E+00
920.170	91.02	-9.75	1.37E-06	9.85	5.73E+00
940.130	90.96	-9.69	1.40E-06	9.79	5.63E+00
954.580	91.03	-9.76	1.42E-06	9.86	5.56E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-1 INPUT 4
RADIUS: 784.360 FEET
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 81.18 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
16:30	0.000	81.18	0.00	0.00E+00
16:30	0.084	81.19	-0.01	9.48E-11
16:30	0.167	81.19	-0.01	1.89E-10
16:30	0.251	81.19	-0.01	2.83E-10
16:30	0.334	81.19	-0.01	3.77E-10
16:30	0.417	81.19	-0.01	4.71E-10
16:30	0.501	81.19	-0.01	5.66E-10
16:30	0.584	81.19	-0.01	6.59E-10
16:30	0.667	81.19	-0.01	7.53E-10
16:30	0.751	81.18	0.00	8.48E-10
16:30	0.834	81.19	-0.01	9.41E-10
16:30	0.917	81.19	-0.01	1.04E-09
16:31	1.001	81.19	-0.01	1.13E-09
16:31	1.391	81.19	-0.01	1.57E-09
16:31	1.724	81.18	0.00	1.95E-09
16:32	2.058	81.18	0.00	2.32E-09
16:32	2.391	81.18	0.00	2.70E-09
16:32	2.724	81.18	0.00	3.07E-09
16:33	3.058	81.18	0.00	3.45E-09
16:33	3.391	81.17	0.01	3.83E-09
16:33	3.724	81.17	0.01	4.20E-09
16:34	4.058	81.17	0.01	4.58E-09
16:34	4.391	81.17	0.01	4.96E-09
16:34	4.724	81.18	0.00	5.33E-09
16:35	5.058	81.17	0.01	5.71E-09
16:35	5.391	81.17	0.01	6.09E-09
16:35	5.724	81.18	0.00	6.46E-09
16:36	6.058	81.18	0.00	6.84E-09
16:36	6.391	81.18	0.00	7.21E-09
16:36	6.724	81.18	0.00	7.59E-09
16:37	7.058	81.17	0.01	7.97E-09
16:37	7.391	81.17	0.01	8.34E-09
16:37	7.724	81.18	0.00	8.72E-09
16:38	8.058	81.17	0.01	9.10E-09
16:38	8.391	81.17	0.01	9.47E-09
16:38	8.724	81.17	0.01	9.85E-09
16:39	9.058	81.17	0.01	1.02E-08
16:39	9.391	81.17	0.01	1.06E-08
16:39	9.724	81.17	0.01	1.10E-08
16:40	10.058	81.17	0.01	1.14E-08

16:42	12.153	81.18	0.00	1.37E-08
16:44	14.153	81.17	0.01	1.60E-08
16:46	16.423	81.17	0.01	1.85E-08
16:48	18.762	81.17	0.01	2.12E-08
16:50	20.193	81.18	0.00	2.28E-08
16:52	22.193	81.17	0.01	2.51E-08
16:54	24.193	81.17	0.01	2.73E-08
16:56	26.193	81.17	0.01	2.96E-08
16:58	28.193	81.17	0.01	3.18E-08
17:00	30.193	81.18	0.00	3.41E-08
17:02	32.193	81.17	0.01	3.63E-08
17:04	34.158	81.18	0.00	3.86E-08
17:06	36.158	81.17	0.01	4.08E-08
17:08	38.158	81.18	0.00	4.31E-08
17:10	40.158	81.17	0.01	4.53E-08
17:12	42.158	81.17	0.01	4.76E-08
17:14	44.158	81.18	0.00	4.98E-08
17:16	46.158	81.17	0.01	5.21E-08
17:18	48.158	81.17	0.01	5.44E-08
17:20	50.158	81.17	0.01	5.66E-08
17:22	52.158	81.17	0.01	5.89E-08
17:24	54.158	81.17	0.01	6.11E-08
17:26	56.158	81.17	0.01	6.34E-08
17:28	58.158	81.16	0.02	6.56E-08
17:30	60.158	81.17	0.01	6.79E-08
17:32	62.247	81.17	0.01	7.03E-08
17:34	64.135	81.17	0.01	7.24E-08
17:36	66.135	81.18	0.00	7.47E-08
17:38	68.135	81.17	0.01	7.69E-08
17:40	70.135	81.17	0.01	7.92E-08
17:42	72.135	81.18	0.00	8.14E-08
17:44	74.135	81.17	0.01	8.37E-08
17:46	76.135	81.17	0.01	8.59E-08
17:48	78.135	81.18	0.00	8.82E-08
17:50	80.782	81.19	-0.01	9.12E-08
17:52	82.182	81.18	0.00	9.28E-08
17:54	84.070	81.18	0.00	9.49E-08
17:56	86.070	81.18	0.00	9.72E-08
17:58	88.070	81.19	-0.01	9.94E-08
18:00	90.070	81.19	-0.01	1.02E-07
18:02	92.070	81.17	0.01	1.04E-07
18:04	94.070	81.19	-0.01	1.06E-07
18:06	96.070	81.19	-0.01	1.08E-07
18:08	98.115	81.19	-0.01	1.11E-07
18:10	100.120	81.19	-0.01	1.13E-07
18:30	120.280	81.20	-0.02	1.36E-07
18:50	140.220	81.22	-0.04	1.58E-07
19:10	160.220	81.22	-0.04	1.81E-07
19:30	180.220	81.23	-0.05	2.03E-07
20:10	220.500	81.26	-0.08	2.49E-07
20:30	240.270	81.28	-0.10	2.71E-07
20:50	260.330	81.29	-0.11	2.94E-07
21:10	280.330	81.30	-0.12	3.16E-07
21:30	300.230	81.32	-0.14	3.39E-07
21:50	320.280	81.31	-0.13	3.62E-07
22:10	340.320	81.31	-0.13	3.84E-07

22:30	360.300	81.32	-0.14	4.07E-07
22:50	380.270	81.32	-0.14	4.29E-07
23:10	400.270	81.33	-0.15	4.52E-07
23:30	420.270	81.33	-0.15	4.74E-07
23:50	440.270	81.33	-0.15	4.97E-07
00:10	460.270	81.34	-0.16	5.20E-07
00:30	480.270	81.34	-0.16	5.42E-07
00:50	500.270	81.35	-0.17	5.65E-07
01:10	520.270	81.35	-0.17	5.87E-07
01:30	540.220	81.36	-0.18	6.10E-07
01:50	560.230	81.36	-0.18	6.32E-07
02:10	580.230	81.36	-0.18	6.55E-07
02:30	600.230	81.36	-0.18	6.78E-07
02:50	620.230	81.37	-0.19	7.00E-07
03:10	640.230	81.38	-0.20	7.23E-07
03:30	660.230	81.38	-0.20	7.45E-07
03:50	680.230	81.38	-0.20	7.68E-07
04:10	700.180	81.38	-0.20	7.90E-07
04:30	720.320	81.40	-0.22	8.13E-07
04:50	740.280	81.39	-0.21	8.36E-07
05:10	760.280	81.39	-0.21	8.58E-07
05:30	780.280	81.40	-0.22	8.81E-07
05:50	800.320	81.40	-0.22	9.03E-07
06:10	820.320	81.40	-0.22	9.26E-07
06:30	840.320	81.40	-0.22	9.49E-07
06:50	860.320	81.41	-0.23	9.71E-07
07:10	880.320	81.42	-0.24	9.94E-07
07:30	900.320	81.42	-0.24	1.02E-06
07:50	920.320	81.42	-0.24	1.04E-06
08:10	940.320	81.43	-0.25	1.06E-06
08:30	960.320	81.43	-0.25	1.08E-06
08:50	980.320	81.44	-0.26	1.11E-06
10:10	1060.500	81.45	-0.27	1.20E-06
11:10	1120.200	81.46	-0.28	1.26E-06
12:10	1180.200	81.47	-0.29	1.33E-06
13:10	1240.200	81.47	-0.29	1.40E-06
14:10	1300.200	81.49	-0.31	1.47E-06
15:10	1360.200	81.49	-0.31	1.54E-06
16:10	1420.200	81.50	-0.32	1.60E-06
17:10	1480.200	81.51	-0.33	1.67E-06
18:10	1540.100	81.51	-0.33	1.74E-06
19:10	1600.300	81.52	-0.34	1.81E-06
20:10	1660.300	81.52	-0.34	1.87E-06
21:10	1720.300	81.54	-0.36	1.94E-06
22:10	1780.200	81.55	-0.37	2.01E-06
23:10	1840.200	81.56	-0.38	2.08E-06
00:10	1900.200	81.57	-0.39	2.14E-06
01:10	1960.300	81.58	-0.40	2.21E-06
02:10	2020.300	81.59	-0.41	2.28E-06
03:10	2080.200	81.60	-0.42	2.35E-06
04:10	2140.200	81.61	-0.43	2.42E-06
05:10	2200.200	81.62	-0.44	2.48E-06
06:10	2260.200	81.63	-0.45	2.55E-06
07:10	2320.200	81.64	-0.46	2.62E-06
08:10	2380.300	81.65	-0.47	2.69E-06
09:10	2440.200	81.67	-0.49	2.75E-06

10:10	2500.300	81.68	-0.50	2.82E-06
11:10	2560.300	81.68	-0.50	2.89E-06
12:10	2620.300	81.69	-0.51	2.96E-06
13:10	2680.300	81.67	-0.49	3.03E-06
14:10	2740.200	81.66	-0.48	3.09E-06
15:10	2800.200	81.66	-0.48	3.16E-06
16:10	2860.300	81.64	-0.46	3.23E-06
17:10	2920.200	81.64	-0.46	3.30E-06
18:10	2980.200	81.62	-0.44	3.36E-06
19:10	3040.200	81.61	-0.43	3.43E-06
20:10	3100.200	81.60	-0.42	3.50E-06
21:10	3160.200	81.58	-0.40	3.57E-06
22:10	3220.200	81.58	-0.40	3.63E-06
23:10	3280.200	81.57	-0.39	3.70E-06
00:10	3340.200	81.57	-0.39	3.77E-06
01:10	3400.200	81.57	-0.39	3.84E-06
02:10	3460.200	81.57	-0.39	3.91E-06
03:10	3520.200	81.57	-0.39	3.97E-06
04:10	3580.200	81.58	-0.40	4.04E-06
05:10	3640.200	81.58	-0.40	4.11E-06
06:10	3700.200	81.59	-0.41	4.18E-06
07:10	3760.400	81.59	-0.41	4.24E-06
08:10	3820.200	81.59	-0.41	4.31E-06
09:10	3880.200	81.60	-0.42	4.38E-06
10:10	3940.200	81.63	-0.45	4.45E-06
11:10	4000.200	81.65	-0.47	4.52E-06
12:10	4060.300	81.65	-0.47	4.58E-06
13:10	4120.200	81.68	-0.50	4.65E-06
14:10	4180.200	81.69	-0.51	4.72E-06
15:10	4240.300	81.72	-0.54	4.79E-06
16:10	4300.200	81.75	-0.57	4.85E-06
16:59	4349.700	81.75	-0.57	4.91E-06

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 Run #2
TEST TYPE : RECOVERY
WELL NUMBER : REI 10-1 INPUT 4
RADIUS: 784.360 FEET
START DATE : 21-Aug-86
START TIME : 16:59
WATER START LEVEL: 81.18 FEET
WATER STOP LEVEL: 81.75 FEET
TOTAL PUMPING TIME: 4349.7 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:59	0.084	81.75	0.00	0.57	9.48E-11	5.18E+04
16:59	0.167	81.75	0.00	0.57	1.89E-10	2.60E+04
16:59	0.251	81.75	0.00	0.57	2.83E-10	1.73E+04
16:59	0.334	81.75	0.00	0.57	3.77E-10	1.30E+04
16:59	0.417	81.75	0.00	0.57	4.71E-10	1.04E+04
16:59	0.501	81.75	0.00	0.57	5.66E-10	8.68E+03
16:59	0.584	81.75	0.00	0.57	6.59E-10	7.45E+03
16:59	0.667	81.75	0.00	0.57	7.53E-10	6.52E+03
16:59	0.751	81.76	-0.01	0.58	8.48E-10	5.79E+03
16:59	0.834	81.76	-0.01	0.58	9.41E-10	5.22E+03
16:59	0.917	81.76	-0.01	0.58	1.04E-09	4.74E+03
17:00	1.001	81.76	-0.01	0.58	1.13E-09	4.35E+03
17:00	1.389	81.75	0.00	0.57	1.57E-09	3.13E+03
17:00	1.723	81.75	0.00	0.57	1.94E-09	2.53E+03
17:01	2.056	81.75	0.00	0.57	2.32E-09	2.12E+03
17:01	2.389	81.75	0.00	0.57	2.70E-09	1.82E+03
17:01	2.723	81.75	0.00	0.57	3.07E-09	1.60E+03
17:02	3.056	81.75	0.00	0.57	3.45E-09	1.42E+03
17:02	3.389	81.75	0.00	0.57	3.83E-09	1.28E+03
17:02	3.723	81.75	0.00	0.57	4.20E-09	1.17E+03
17:03	4.056	81.75	0.00	0.57	4.58E-09	1.07E+03
17:03	4.389	81.74	0.01	0.56	4.95E-09	9.92E+02
17:03	4.723	81.75	0.00	0.57	5.33E-09	9.22E+02
17:04	5.056	81.76	-0.01	0.58	5.71E-09	8.61E+02
17:04	5.389	81.75	0.00	0.57	6.08E-09	8.08E+02
17:04	5.723	81.75	0.00	0.57	6.46E-09	7.61E+02
17:05	6.056	81.75	0.00	0.57	6.84E-09	7.19E+02
17:05	6.389	81.75	0.00	0.57	7.21E-09	6.82E+02
17:05	6.723	81.75	0.00	0.57	7.59E-09	6.48E+02
17:06	7.056	81.75	0.00	0.57	7.96E-09	6.17E+02
17:06	7.389	81.75	0.00	0.57	8.34E-09	5.90E+02
17:06	7.723	81.75	0.00	0.57	8.72E-09	5.64E+02
17:07	8.056	81.75	0.00	0.57	9.09E-09	5.41E+02
17:07	8.389	81.75	0.00	0.57	9.47E-09	5.20E+02
17:07	8.723	81.75	0.00	0.57	9.85E-09	5.00E+02
17:08	9.056	81.75	0.00	0.57	1.02E-08	4.81E+02
17:08	9.389	81.74	0.01	0.56	1.06E-08	4.64E+02
17:08	9.723	81.75	0.00	0.57	1.10E-08	4.48E+02

17:09	10.056	81.75	0.00	0.57	1.14E-08	4.34E+02
17:11	12.165	81.75	0.00	0.57	1.37E-08	3.59E+02
17:13	14.495	81.75	0.00	0.57	1.64E-08	3.01E+02
17:15	16.165	81.75	0.00	0.57	1.82E-08	2.70E+02
17:17	18.165	81.74	0.01	0.56	2.05E-08	2.40E+02
17:19	20.203	81.75	0.00	0.57	2.28E-08	2.16E+02
17:21	22.203	81.75	0.00	0.57	2.51E-08	1.97E+02
17:23	24.225	81.75	0.00	0.57	2.73E-08	1.81E+02
17:25	26.225	81.76	-0.01	0.58	2.96E-08	1.67E+02
17:27	28.225	81.75	0.00	0.57	3.19E-08	1.55E+02
17:29	30.225	81.75	0.00	0.57	3.41E-08	1.45E+02
17:31	32.225	81.76	-0.01	0.58	3.64E-08	1.36E+02
17:33	34.225	81.76	-0.01	0.58	3.86E-08	1.28E+02
17:35	36.225	81.76	-0.01	0.58	4.09E-08	1.21E+02
17:37	38.225	81.76	-0.01	0.58	4.31E-08	1.15E+02
17:39	40.225	81.76	-0.01	0.58	4.54E-08	1.09E+02
17:41	42.225	81.75	0.00	0.57	4.77E-08	1.04E+02
17:43	44.225	81.75	0.00	0.57	4.99E-08	9.94E+01
17:45	46.225	81.75	0.00	0.57	5.22E-08	9.51E+01
17:47	48.225	81.75	0.00	0.57	5.44E-08	9.12E+01
17:49	50.225	81.74	0.01	0.56	5.67E-08	8.76E+01
17:51	52.225	81.74	0.01	0.56	5.90E-08	8.43E+01
17:53	54.225	81.75	0.00	0.57	6.12E-08	8.12E+01
17:55	56.225	81.75	0.00	0.57	6.35E-08	7.84E+01
17:57	58.225	81.74	0.01	0.56	6.57E-08	7.57E+01
17:59	60.225	81.74	0.01	0.56	6.80E-08	7.32E+01
18:01	62.225	81.74	0.01	0.56	7.02E-08	7.09E+01
18:03	64.225	81.74	0.01	0.56	7.25E-08	6.87E+01
18:05	66.225	81.73	0.02	0.55	7.48E-08	6.67E+01
18:07	68.225	81.74	0.01	0.56	7.70E-08	6.48E+01
18:09	70.225	81.74	0.01	0.56	7.93E-08	6.29E+01
18:11	72.225	81.73	0.02	0.55	8.15E-08	6.12E+01
18:13	74.225	81.73	0.02	0.55	8.38E-08	5.96E+01
18:15	76.225	81.73	0.02	0.55	8.60E-08	5.81E+01
18:17	78.225	81.73	0.02	0.55	8.83E-08	5.66E+01
18:19	80.225	81.72	0.03	0.54	9.06E-08	5.52E+01
18:21	82.225	81.72	0.03	0.54	9.28E-08	5.39E+01
18:23	84.225	81.72	0.03	0.54	9.51E-08	5.26E+01
18:25	86.225	81.72	0.03	0.54	9.73E-08	5.14E+01
18:27	88.225	81.72	0.03	0.54	9.96E-08	5.03E+01
18:29	90.225	81.72	0.03	0.54	1.02E-07	4.92E+01
18:31	92.225	81.72	0.03	0.54	1.04E-07	4.82E+01
18:33	94.225	81.72	0.03	0.54	1.06E-07	4.72E+01
18:35	96.225	81.72	0.03	0.54	1.09E-07	4.62E+01
18:37	98.225	81.72	0.03	0.54	1.11E-07	4.53E+01
18:39	100.230	81.71	0.04	0.53	1.13E-07	4.44E+01
18:59	120.230	81.71	0.04	0.53	1.36E-07	3.72E+01
19:19	140.230	81.70	0.05	0.52	1.58E-07	3.20E+01
19:39	160.230	81.67	0.08	0.49	1.81E-07	2.81E+01
19:59	180.220	81.66	0.09	0.48	2.03E-07	2.51E+01
20:19	200.220	81.64	0.11	0.46	2.26E-07	2.27E+01
20:39	220.220	81.63	0.12	0.45	2.49E-07	2.08E+01
20:59	240.220	81.61	0.14	0.43	2.71E-07	1.91E+01
21:19	260.220	81.60	0.15	0.42	2.94E-07	1.77E+01
21:39	280.120	81.59	0.16	0.41	3.16E-07	1.65E+01
21:59	300.120	81.58	0.17	0.40	3.39E-07	1.55E+01

22:19	320.120	81.56	0.19	0.38	3.61E-07	1.46E+01
22:39	340.200	81.55	0.20	0.37	3.84E-07	1.38E+01
22:59	360.220	81.54	0.21	0.36	4.07E-07	1.31E+01
23:19	380.220	81.53	0.22	0.35	4.29E-07	1.24E+01
23:39	400.220	81.51	0.24	0.33	4.52E-07	1.19E+01
23:59	420.220	81.50	0.25	0.32	4.74E-07	1.14E+01
00:19	440.220	81.50	0.25	0.32	4.97E-07	1.09E+01
00:39	460.220	81.49	0.26	0.31	5.19E-07	1.05E+01
00:59	480.220	81.48	0.27	0.30	5.42E-07	1.01E+01
01:19	500.220	81.47	0.28	0.29	5.65E-07	9.70E+00
01:39	520.220	81.46	0.29	0.28	5.87E-07	9.36E+00
01:59	540.220	81.45	0.30	0.27	6.10E-07	9.05E+00
02:19	560.200	81.44	0.31	0.26	6.32E-07	8.76E+00
02:39	580.200	81.43	0.32	0.25	6.55E-07	8.50E+00
02:59	600.200	81.42	0.33	0.24	6.77E-07	8.25E+00
03:19	620.200	81.42	0.33	0.24	7.00E-07	8.01E+00
03:39	640.200	81.41	0.34	0.23	7.23E-07	7.79E+00
03:59	660.220	81.39	0.36	0.21	7.45E-07	7.59E+00
04:19	680.220	81.39	0.36	0.21	7.68E-07	7.39E+00
04:39	700.220	81.38	0.37	0.20	7.90E-07	7.21E+00
04:59	720.220	81.38	0.37	0.20	8.13E-07	7.04E+00
05:19	740.220	81.37	0.38	0.19	8.36E-07	6.88E+00
05:39	760.170	81.36	0.39	0.18	8.58E-07	6.72E+00
05:59	780.080	81.36	0.39	0.18	8.81E-07	6.58E+00
06:19	800.080	81.35	0.40	0.17	9.03E-07	6.44E+00
06:39	820.080	81.35	0.40	0.17	9.26E-07	6.30E+00
06:59	840.080	81.35	0.40	0.17	9.48E-07	6.18E+00
07:19	860.070	81.34	0.41	0.16	9.71E-07	6.06E+00
07:39	880.170	81.34	0.41	0.16	9.94E-07	5.94E+00
07:59	900.170	81.33	0.42	0.15	1.02E-06	5.83E+00
08:19	920.170	81.34	0.41	0.16	1.04E-06	5.73E+00
08:39	940.130	81.33	0.42	0.15	1.06E-06	5.63E+00
08:53	954.580	81.33	0.42	0.15	1.08E-06	5.56E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-1 INPUT 5
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 6.29 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
16:30	0.000	6.29	0.00
16:30	0.084	6.29	0.00
16:30	0.167	6.29	0.00
16:30	0.251	6.29	0.00
16:30	0.334	6.29	0.00
16:30	0.417	6.29	0.00
16:30	0.501	6.29	0.00
16:30	0.584	6.29	0.00
16:30	0.667	6.30	-0.01
16:30	0.751	6.30	-0.01
16:30	0.834	6.30	-0.01
16:30	0.917	6.29	0.00
16:31	1.001	6.29	0.00
16:31	1.391	6.29	0.00
16:31	1.724	6.29	0.00
16:32	2.058	6.29	0.00
16:32	2.391	6.29	0.00
16:32	2.724	6.29	0.00
16:33	3.058	6.29	0.00
16:33	3.391	6.28	0.01
16:33	3.724	6.28	0.01
16:34	4.058	6.29	0.00
16:34	4.391	6.29	0.00
16:34	4.724	6.29	0.00
16:35	5.058	6.29	0.00
16:35	5.391	6.29	0.00
16:35	5.724	6.28	0.01
16:36	6.058	6.29	0.00
16:36	6.391	6.29	0.00
16:36	6.724	6.29	0.00
16:37	7.058	6.29	0.00
16:37	7.391	6.29	0.00
16:37	7.724	6.29	0.00
16:38	8.058	6.29	0.00
16:38	8.391	6.29	0.00
16:38	8.724	6.30	-0.01
16:39	9.058	6.29	0.00
16:39	9.391	6.29	0.00
16:39	9.724	6.29	0.00
16:40	10.058	6.29	0.00

16:42	12.153	6.29	0.00
16:44	14.153	6.28	0.01
16:46	16.423	6.29	0.00
16:48	18.762	6.29	0.00
16:50	20.193	6.28	0.01
16:52	22.193	6.29	0.00
16:54	24.193	6.28	0.01
16:56	26.193	6.28	0.01
16:58	28.193	6.28	0.01
17:00	30.193	6.30	-0.01
17:02	32.193	6.28	0.01
17:04	34.158	6.28	0.01
17:06	36.158	6.29	0.00
17:08	38.158	6.28	0.01
17:10	40.158	6.27	0.02
17:12	42.158	6.27	0.02
17:14	44.158	6.28	0.01
17:16	46.158	6.28	0.01
17:18	48.158	6.28	0.01
17:20	50.158	6.28	0.01
17:22	52.158	6.27	0.02
17:24	54.158	6.27	0.02
17:26	56.158	6.27	0.02
17:28	58.158	6.27	0.02
17:30	60.158	6.28	0.01
17:32	62.247	6.27	0.02
17:34	64.135	6.27	0.02
17:36	66.135	6.28	0.01
17:38	68.135	6.28	0.01
17:40	70.135	6.27	0.02
17:42	72.135	6.27	0.02
17:44	74.135	6.27	0.02
17:46	76.135	6.27	0.02
17:48	78.135	6.26	0.03
17:50	80.782	6.26	0.03
17:52	82.182	6.26	0.03
17:54	84.070	6.26	0.03
17:56	86.070	6.26	0.03
17:58	88.070	6.26	0.03
18:00	90.070	6.27	0.02
18:02	92.070	6.26	0.03
18:04	94.070	6.27	0.02
18:06	96.070	6.28	0.01
18:08	98.115	6.28	0.01
18:10	100.120	6.27	0.02
18:30	120.280	6.26	0.03
18:50	140.220	6.24	0.05
19:10	160.220	6.25	0.04
19:30	180.220	6.25	0.04
20:10	220.500	6.28	0.01
20:30	240.270	6.28	0.01
20:50	260.330	6.29	0.00
21:10	280.330	6.27	0.02
21:30	300.230	6.27	0.02
21:50	320.280	6.26	0.03
22:10	340.320	6.26	0.03

22:30	360.300	6.26	0.03
22:50	380.270	6.26	0.03
23:10	400.270	6.26	0.03
23:30	420.270	6.26	0.03
23:50	440.270	6.26	0.03
00:10	460.270	6.25	0.04
00:30	480.270	6.25	0.04
00:50	500.270	6.24	0.05
01:10	520.270	6.24	0.05
01:30	540.220	6.25	0.04
01:50	560.230	6.25	0.04
02:10	580.230	6.24	0.05
02:30	600.230	6.24	0.05
02:50	620.230	6.24	0.05
03:10	640.230	6.24	0.05
03:30	660.230	6.24	0.05
03:50	680.230	6.24	0.05
04:10	700.180	6.23	0.06
04:30	720.320	6.23	0.06
04:50	740.280	6.23	0.06
05:10	760.280	6.24	0.05
05:30	780.280	6.24	0.05
05:50	800.320	6.24	0.05
06:10	820.320	6.24	0.05
06:30	840.320	6.24	0.05
06:50	860.320	6.24	0.05
07:10	880.320	6.23	0.06
07:30	900.320	6.23	0.06
07:50	920.320	6.23	0.06
08:10	940.320	6.22	0.07
08:30	960.320	6.22	0.07
08:50	980.320	6.23	0.06
10:10	1060.500	6.23	0.06
11:10	1120.200	6.24	0.05
12:10	1180.200	6.23	0.06
13:10	1240.200	6.24	0.05
14:10	1300.200	6.26	0.03
15:10	1360.200	6.28	0.01
16:10	1420.200	6.27	0.02
17:10	1480.200	6.29	0.00
18:10	1540.100	6.30	-0.01
19:10	1600.300	6.31	-0.02
20:10	1660.300	6.32	-0.03
21:10	1720.300	6.33	-0.04
22:10	1780.200	6.34	-0.05
23:10	1840.200	6.34	-0.05
00:10	1900.200	6.33	-0.04
01:10	1960.300	6.33	-0.04
02:10	2020.300	6.33	-0.04
03:10	2080.200	6.33	-0.04
04:10	2140.200	6.31	-0.02
05:10	2200.200	6.31	-0.02
06:10	2260.200	6.30	-0.01
07:10	2320.200	6.29	0.00
08:10	2380.300	6.29	0.00
09:10	2440.200	6.26	0.03

10:10	2500.300	6.25	0.04
11:10	2560.300	6.25	0.04
12:10	2620.300	6.23	0.06
13:10	2680.300	6.20	0.09
14:10	2740.200	6.18	0.11
15:10	2800.200	6.18	0.11
16:10	2860.300	6.15	0.14
17:10	2920.200	6.14	0.15
18:10	2980.200	6.14	0.15
19:10	3040.200	6.13	0.16
20:10	3100.200	6.12	0.17
21:10	3160.200	6.12	0.17
22:10	3220.200	6.13	0.16
23:10	3280.200	6.13	0.16
00:10	3340.200	6.12	0.17
01:10	3400.200	6.12	0.17
02:10	3460.200	6.11	0.18
03:10	3520.200	6.11	0.18
04:10	3580.200	6.11	0.18
05:10	3640.200	6.11	0.18
06:10	3700.200	6.10	0.19
07:10	3760.400	6.10	0.19
08:10	3820.200	6.10	0.19
09:10	3880.200	6.10	0.19
10:10	3940.200	6.11	0.18
11:10	4000.200	6.12	0.17
12:10	4060.300	6.12	0.17
13:10	4120.200	6.07	0.22
14:10	4180.200	6.13	0.16
15:10	4240.300	6.14	0.15
16:10	4300.200	6.14	0.15
16:59	4349.700	6.17	0.12

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 Run #2
TEST TYPE : RECOVERY
WELL NUMBER : REI 3-1 INPUT 5
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:59
WATER START LEVEL: 6.29 FEET
WATER STOP LEVEL: 6.17 FEET
TOTAL PUMPING TIME: 4349.7 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:59	0.084	6.17	0.00	0.12
16:59	0.167	6.17	0.00	0.12
16:59	0.251	6.16	0.01	0.13
16:59	0.334	6.16	0.01	0.13
16:59	0.417	6.16	0.01	0.13
16:59	0.501	6.17	0.00	0.12
16:59	0.584	6.17	0.00	0.12
16:59	0.667	6.17	0.00	0.12
16:59	0.751	6.18	-0.01	0.11
16:59	0.834	6.17	0.00	0.12
16:59	0.917	6.16	0.01	0.13
17:00	1.001	6.17	0.00	0.12
17:00	1.389	6.16	0.01	0.13
17:00	1.723	6.16	0.01	0.13
17:01	2.056	6.16	0.01	0.13
17:01	2.389	6.16	0.01	0.13
17:01	2.723	6.17	0.00	0.12
17:02	3.056	6.17	0.00	0.12
17:02	3.389	6.16	0.01	0.13
17:02	3.723	6.17	0.00	0.12
17:03	4.056	6.17	0.00	0.12
17:03	4.389	6.16	0.01	0.13
17:03	4.723	6.16	0.01	0.13
17:04	5.056	6.17	0.00	0.12
17:04	5.389	6.16	0.01	0.13
17:04	5.723	6.16	0.01	0.13
17:05	6.056	6.16	0.01	0.13
17:05	6.389	6.16	0.01	0.13
17:05	6.723	6.16	0.01	0.13
17:06	7.056	6.16	0.01	0.13
17:06	7.389	6.16	0.01	0.13
17:06	7.723	6.16	0.01	0.13
17:07	8.056	6.17	0.00	0.12
17:07	8.389	6.16	0.01	0.13
17:07	8.723	6.17	0.00	0.12
17:08	9.056	6.16	0.01	0.13
17:08	9.389	6.16	0.01	0.13
17:08	9.723	6.17	0.00	0.12

17:09	10.056	6.16	0.01	0.13
17:11	12.165	6.16	0.01	0.13
17:13	14.495	6.17	0.00	0.12
17:15	16.165	6.16	0.01	0.13
17:17	18.165	6.16	0.01	0.13
17:19	20.203	6.17	0.00	0.12
17:21	22.203	6.16	0.01	0.13
17:23	24.225	6.16	0.01	0.13
17:25	26.225	6.18	-0.01	0.11
17:27	28.225	6.16	0.01	0.13
17:29	30.225	6.16	0.01	0.13
17:31	32.225	6.16	0.01	0.13
17:33	34.225	6.16	0.01	0.13
17:35	36.225	6.16	0.01	0.13
17:37	38.225	6.16	0.01	0.13
17:39	40.225	6.16	0.01	0.13
17:41	42.225	6.16	0.01	0.13
17:43	44.225	6.16	0.01	0.13
17:45	46.225	6.16	0.01	0.13
17:47	48.225	6.16	0.01	0.13
17:49	50.225	6.16	0.01	0.13
17:51	52.225	6.16	0.01	0.13
17:53	54.225	6.16	0.01	0.13
17:55	56.225	6.16	0.01	0.13
17:57	58.225	6.17	0.00	0.12
17:59	60.225	6.16	0.01	0.13
18:01	62.225	6.15	0.02	0.14
18:03	64.225	6.15	0.02	0.14
18:05	66.225	6.15	0.02	0.14
18:07	68.225	6.15	0.02	0.14
18:09	70.225	6.15	0.02	0.14
18:11	72.225	6.15	0.02	0.14
18:13	74.225	6.15	0.02	0.14
18:15	76.225	6.15	0.02	0.14
18:17	78.225	6.15	0.02	0.14
18:19	80.225	6.15	0.02	0.14
18:21	82.225	6.15	0.02	0.14
18:23	84.225	6.15	0.02	0.14
18:25	86.225	6.15	0.02	0.14
18:27	88.225	6.14	0.03	0.15
18:29	90.225	6.14	0.03	0.15
18:31	92.225	6.14	0.03	0.15
18:33	94.225	6.14	0.03	0.15
18:35	96.225	6.14	0.03	0.15
18:37	98.225	6.14	0.03	0.15
18:39	100.230	6.14	0.03	0.15
18:59	120.230	6.13	0.04	0.16
19:19	140.230	6.13	0.04	0.16
19:39	160.230	6.12	0.05	0.17
19:59	180.220	6.12	0.05	0.17
20:19	200.220	6.12	0.05	0.17
20:39	220.220	6.12	0.05	0.17
20:59	240.220	6.12	0.05	0.17
21:19	260.220	15.96	-9.79	9.67
21:39	280.120	15.96	-9.79	9.67
21:59	300.120	15.96	-9.79	9.67

22:19	320.120	15.97	-9.80	9.68
22:39	340.200	15.97	-9.80	9.68
22:59	360.220	15.98	-9.81	9.69
23:19	380.220	15.98	-9.81	9.69
23:39	400.220	15.98	-9.81	9.69
23:59	420.220	15.98	-9.81	9.69
00:19	440.220	15.98	-9.81	9.69
00:39	460.220	15.98	-9.81	9.69
00:59	480.220	15.98	-9.81	9.69
01:19	500.220	15.98	-9.81	9.69
01:39	520.220	15.98	-9.81	9.69
01:59	540.220	15.98	-9.81	9.69
02:19	560.200	15.98	-9.81	9.69
02:39	580.200	15.99	-9.82	9.70
02:59	600.200	15.99	-9.82	9.70
03:19	620.200	15.99	-9.82	9.70
03:39	640.200	15.99	-9.82	9.70
03:59	660.220	15.99	-9.82	9.70
04:19	680.220	15.99	-9.82	9.70
04:39	700.220	16.00	-9.83	9.71
04:59	720.220	16.00	-9.83	9.71
05:19	740.220	16.00	-9.83	9.71
05:39	760.170	16.00	-9.83	9.71
05:59	780.080	15.95	-9.78	9.66
06:19	800.080	15.95	-9.78	9.66
06:39	820.080	15.95	-9.78	9.66
06:59	840.080	15.95	-9.78	9.66
07:19	860.070	15.95	-9.78	9.66
07:39	880.170	15.95	-9.78	9.66
07:59	900.170	15.95	-9.78	9.66
08:19	920.170	15.96	-9.79	9.67
08:39	940.130	15.98	-9.81	9.69
08:53	954.580	15.96	-9.79	9.67

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-2 INPUT 6
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 5.87 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
16:30	0.000	5.87	0.00
16:30	0.084	5.87	0.00
16:30	0.167	5.87	0.00
16:30	0.251	5.87	0.00
16:30	0.334	5.87	0.00
16:30	0.417	5.87	0.00
16:30	0.501	5.87	0.00
16:30	0.584	5.87	0.00
16:30	0.667	5.87	0.00
16:30	0.751	5.87	0.00
16:30	0.834	5.87	0.00
16:30	0.917	5.87	0.00
16:31	1.001	5.87	0.00
16:31	1.391	5.87	0.00
16:31	1.724	5.87	0.00
16:32	2.058	5.87	0.00
16:32	2.391	5.87	0.00
16:32	2.724	5.87	0.00
16:33	3.058	5.87	0.00
16:33	3.391	5.87	0.00
16:33	3.724	5.87	0.00
16:34	4.058	5.87	0.00
16:34	4.391	5.87	0.00
16:34	4.724	5.87	0.00
16:35	5.058	5.87	0.00
16:35	5.391	5.87	0.00
16:35	5.724	5.87	0.00
16:36	6.058	5.87	0.00
16:36	6.391	5.87	0.00
16:36	6.724	5.87	0.00
16:37	7.058	5.87	0.00
16:37	7.391	5.87	0.00
16:37	7.724	5.87	0.00
16:38	8.058	5.87	0.00
16:38	8.391	5.87	0.00
16:38	8.724	5.88	-0.01
16:39	9.058	5.87	0.00
16:39	9.391	5.87	0.00
16:39	9.724	5.87	0.00
16:40	10.058	5.88	-0.01

16:42	12.153	5.87	0.00
16:44	14.153	5.87	0.00
16:46	16.423	5.87	0.00
16:48	18.762	5.87	0.00
16:50	20.193	5.87	0.00
16:52	22.193	5.87	0.00
16:54	24.193	5.87	0.00
16:56	26.193	5.87	0.00
16:58	28.193	5.87	0.00
17:00	30.193	5.88	-0.01
17:02	32.193	5.87	0.00
17:04	34.158	5.88	-0.01
17:06	36.158	5.88	-0.01
17:08	38.158	5.87	0.00
17:10	40.158	5.87	0.00
17:12	42.158	5.87	0.00
17:14	44.158	5.88	-0.01
17:16	46.158	5.88	-0.01
17:18	48.158	5.88	-0.01
17:20	50.158	5.88	-0.01
17:22	52.158	5.87	0.00
17:24	54.158	5.88	-0.01
17:26	56.158	5.87	0.00
17:28	58.158	5.88	-0.01
17:30	60.158	5.88	-0.01
17:32	62.247	5.87	0.00
17:34	64.135	5.88	-0.01
17:36	66.135	5.88	-0.01
17:38	68.135	5.88	-0.01
17:40	70.135	5.88	-0.01
17:42	72.135	5.88	-0.01
17:44	74.135	5.88	-0.01
17:46	76.135	5.88	-0.01
17:48	78.135	5.88	-0.01
17:50	80.782	5.88	-0.01
17:52	82.182	5.87	0.00
17:54	84.070	5.88	-0.01
17:56	86.070	5.88	-0.01
17:58	88.070	5.88	-0.01
18:00	90.070	5.88	-0.01
18:02	92.070	5.88	-0.01
18:04	94.070	5.88	-0.01
18:06	96.070	5.89	-0.02
18:08	98.115	5.89	-0.02
18:10	100.120	5.88	-0.01
18:30	120.280	5.88	-0.01
18:50	140.220	5.87	0.00
19:10	160.220	5.88	-0.01
19:30	180.220	5.88	-0.01
20:10	220.500	5.90	-0.03
20:30	240.270	5.90	-0.03
20:50	260.330	5.90	-0.03
21:10	280.330	5.90	-0.03
21:30	300.230	5.89	-0.02
21:50	320.280	5.89	-0.02
22:10	340.320	5.90	-0.03

22:30	360.300	5.89	-0.02
22:50	380.270	5.89	-0.02
23:10	400.270	5.89	-0.02
23:30	420.270	5.88	-0.01
23:50	440.270	5.88	-0.01
00:10	460.270	5.88	-0.01
00:30	480.270	5.87	0.00
00:50	500.270	5.87	0.00
01:10	520.270	5.87	0.00
01:30	540.220	5.86	0.01
01:50	560.230	5.86	0.01
02:10	580.230	5.86	0.01
02:30	600.230	5.85	0.02
02:50	620.230	5.85	0.02
03:10	640.230	5.85	0.02
03:30	660.230	5.84	0.03
03:50	680.230	5.84	0.03
04:10	700.180	5.83	0.04
04:30	720.320	5.83	0.04
04:50	740.280	5.83	0.04
05:10	760.280	5.83	0.04
05:30	780.280	5.83	0.04
05:50	800.320	5.83	0.04
06:10	820.320	5.82	0.05
06:30	840.320	5.82	0.05
06:50	860.320	5.82	0.05
07:10	880.320	5.81	0.06
07:30	900.320	5.81	0.06
07:50	920.320	5.81	0.06
08:10	940.320	5.80	0.07
08:30	960.320	5.80	0.07
08:50	980.320	5.80	0.07
10:10	1060.500	5.79	0.08
11:10	1120.200	5.80	0.07
12:10	1180.200	5.79	0.08
13:10	1240.200	5.81	0.06
14:10	1300.200	5.82	0.05
15:10	1360.200	5.84	0.03
16:10	1420.200	5.83	0.04
17:10	1480.200	5.86	0.01
18:10	1540.100	5.87	0.00
19:10	1600.300	5.88	-0.01
20:10	1660.300	5.88	-0.01
21:10	1720.300	5.89	-0.02
22:10	1780.200	5.89	-0.02
23:10	1840.200	5.89	-0.02
00:10	1900.200	5.88	-0.01
01:10	1960.300	5.88	-0.01
02:10	2020.300	5.87	0.00
03:10	2080.200	5.86	0.01
04:10	2140.200	5.85	0.02
05:10	2200.200	5.85	0.02
06:10	2260.200	5.84	0.03
07:10	2320.200	5.83	0.04
08:10	2380.300	5.81	0.06
09:10	2440.200	5.80	0.07

10:10	2500.300	5.78	0.09
11:10	2560.300	5.78	0.09
12:10	2620.300	5.77	0.10
13:10	2680.300	5.75	0.12
14:10	2740.200	5.74	0.13
15:10	2800.200	5.73	0.14
16:10	2860.300	5.71	0.16
17:10	2920.200	5.70	0.17
18:10	2980.200	5.68	0.19
19:10	3040.200	5.66	0.21
20:10	3100.200	5.65	0.22
21:10	3160.200	5.64	0.23
22:10	3220.200	5.63	0.24
23:10	3280.200	5.62	0.25
00:10	3340.200	5.61	0.26
01:10	3400.200	5.61	0.26
02:10	3460.200	5.60	0.27
03:10	3520.200	5.59	0.28
04:10	3580.200	5.59	0.28
05:10	3640.200	5.58	0.29
06:10	3700.200	5.58	0.29
07:10	3760.400	5.57	0.30
08:10	3820.200	5.57	0.30
09:10	3880.200	5.57	0.30
10:10	3940.200	5.57	0.30
11:10	4000.200	5.57	0.30
12:10	4060.300	5.57	0.30
13:10	4120.200	5.56	0.31
14:10	4180.200	5.59	0.28
15:10	4240.300	5.59	0.28
16:10	4300.200	5.59	0.28
16:59	4349.700	5.62	0.25

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 Run #2
TEST TYPE : RECOVERY
WELL NUMBER : REI 3-2 INPUT 6
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:59
WATER START LEVEL: 5.87 FEET
WATER STOP LEVEL: 5.62 FEET
TOTAL PUMPING TIME: 4349.7 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:59	0.084	5.62	0.00	0.25
16:59	0.167	5.62	0.00	0.25
16:59	0.251	5.62	0.00	0.25
16:59	0.334	5.62	0.00	0.25
16:59	0.417	5.62	0.00	0.25
16:59	0.501	5.62	0.00	0.25
16:59	0.584	5.62	0.00	0.25
16:59	0.667	5.62	0.00	0.25
16:59	0.751	5.62	0.00	0.25
16:59	0.834	5.62	0.00	0.25
16:59	0.917	5.62	0.00	0.25
17:00	1.001	5.62	0.00	0.25
17:00	1.389	5.62	0.00	0.25
17:00	1.723	5.62	0.00	0.25
17:01	2.056	5.62	0.00	0.25
17:01	2.389	5.61	0.01	0.26
17:01	2.723	5.62	0.00	0.25
17:02	3.056	5.61	0.01	0.26
17:02	3.389	5.61	0.01	0.26
17:02	3.723	5.61	0.01	0.26
17:03	4.056	5.62	0.00	0.25
17:03	4.389	5.62	0.00	0.25
17:03	4.723	5.62	0.00	0.25
17:04	5.056	5.62	0.00	0.25
17:04	5.389	5.62	0.00	0.25
17:04	5.723	5.62	0.00	0.25
17:05	6.056	5.62	0.00	0.25
17:05	6.389	5.62	0.00	0.25
17:05	6.723	5.62	0.00	0.25
17:06	7.056	5.62	0.00	0.25
17:06	7.389	5.62	0.00	0.25
17:06	7.723	5.62	0.00	0.25
17:07	8.056	5.62	0.00	0.25
17:07	8.389	5.62	0.00	0.25
17:07	8.723	5.62	0.00	0.25
17:08	9.056	5.62	0.00	0.25
17:08	9.389	5.62	0.00	0.25
17:08	9.723	5.62	0.00	0.25

17:09	10.056	5.62	0.00	0.25
17:11	12.165	5.62	0.00	0.25
17:13	14.495	5.62	0.00	0.25
17:15	16.165	5.62	0.00	0.25
17:17	18.165	5.62	0.00	0.25
17:19	20.203	5.62	0.00	0.25
17:21	22.203	5.62	0.00	0.25
17:23	24.225	5.62	0.00	0.25
17:25	26.225	5.63	-0.01	0.24
17:27	28.225	5.62	0.00	0.25
17:29	30.225	5.62	0.00	0.25
17:31	32.225	5.63	-0.01	0.24
17:33	34.225	5.62	0.00	0.25
17:35	36.225	5.63	-0.01	0.24
17:37	38.225	5.63	-0.01	0.24
17:39	40.225	5.63	-0.01	0.24
17:41	42.225	5.63	-0.01	0.24
17:43	44.225	5.63	-0.01	0.24
17:45	46.225	5.63	-0.01	0.24
17:47	48.225	5.63	-0.01	0.24
17:49	50.225	5.63	-0.01	0.24
17:51	52.225	5.63	-0.01	0.24
17:53	54.225	5.63	-0.01	0.24
17:55	56.225	5.63	-0.01	0.24
17:57	58.225	5.63	-0.01	0.24
17:59	60.225	5.63	-0.01	0.24
18:01	62.225	5.63	-0.01	0.24
18:03	64.225	5.63	-0.01	0.24
18:05	66.225	5.63	-0.01	0.24
18:07	68.225	5.63	-0.01	0.24
18:09	70.225	5.63	-0.01	0.24
18:11	72.225	5.63	-0.01	0.24
18:13	74.225	5.63	-0.01	0.24
18:15	76.225	5.63	-0.01	0.24
18:17	78.225	5.63	-0.01	0.24
18:19	80.225	5.63	-0.01	0.24
18:21	82.225	5.63	-0.01	0.24
18:23	84.225	5.64	-0.02	0.23
18:25	86.225	5.64	-0.02	0.23
18:27	88.225	5.64	-0.02	0.23
18:29	90.225	5.64	-0.02	0.23
18:31	92.225	5.63	-0.01	0.24
18:33	94.225	5.64	-0.02	0.23
18:35	96.225	5.64	-0.02	0.23
18:37	98.225	5.64	-0.02	0.23
18:39	100.230	5.64	-0.02	0.23
18:59	120.230	5.64	-0.02	0.23
19:19	140.230	5.63	-0.01	0.24
19:39	160.230	5.63	-0.01	0.24
19:59	180.220	5.63	-0.01	0.24
20:19	200.220	5.62	0.00	0.25
20:39	220.220	5.62	0.00	0.25
20:59	240.220	-999.99	1005.61	1005.86
21:19	260.220	15.58	-9.96	9.71
21:39	280.120	15.57	-9.95	9.70
21:59	300.120	15.55	-9.93	9.68

22:19	320.120	15.55	-9.93	9.68
22:39	340.200	15.54	-9.92	9.67
22:59	360.220	15.54	-9.92	9.67
23:19	380.220	15.54	-9.92	9.67
23:39	400.220	15.54	-9.92	9.67
23:59	420.220	15.54	-9.92	9.67
00:19	440.220	15.54	-9.92	9.67
00:39	460.220	15.54	-9.92	9.67
00:59	480.220	15.54	-9.92	9.67
01:19	500.220	15.54	-9.92	9.67
01:39	520.220	15.54	-9.92	9.67
01:59	540.220	15.54	-9.92	9.67
02:19	560.200	15.54	-9.92	9.67
02:39	580.200	15.54	-9.92	9.67
02:59	600.200	15.54	-9.92	9.67
03:19	620.200	15.54	-9.92	9.67
03:39	640.200	15.54	-9.92	9.67
03:59	660.220	15.54	-9.92	9.67
04:19	680.220	15.54	-9.92	9.67
04:39	700.220	15.54	-9.92	9.67
04:59	720.220	15.54	-9.92	9.67
05:19	740.220	15.54	-9.92	9.67
05:39	760.170	15.54	-9.92	9.67
05:59	780.080	15.54	-9.92	9.67
06:19	800.080	15.54	-9.92	9.67
06:39	820.080	15.54	-9.92	9.67
06:59	840.080	15.54	-9.92	9.67
07:19	860.070	15.54	-9.92	9.67
07:39	880.170	15.54	-9.92	9.67
07:59	900.170	15.54	-9.92	9.67
08:19	920.170	15.54	-9.92	9.67
08:39	940.130	15.54	-9.92	9.67
08:53	954.580	15.54	-9.92	9.67

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-3 INPUT 7
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:30
WATER START LEVEL: 7.32 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
16:30	0.000	7.32	0.00
16:30	0.084	7.33	-0.01
16:30	0.167	7.33	-0.01
16:30	0.251	7.33	-0.01
16:30	0.334	7.33	-0.01
16:30	0.417	7.33	-0.01
16:30	0.501	7.33	-0.01
16:30	0.584	7.33	-0.01
16:30	0.667	7.33	-0.01
16:30	0.751	7.33	-0.01
16:30	0.834	7.33	-0.01
16:30	0.917	7.33	-0.01
16:31	1.001	7.33	-0.01
16:31	1.391	7.33	-0.01
16:31	1.724	7.33	-0.01
16:32	2.058	7.33	-0.01
16:32	2.391	7.33	-0.01
16:32	2.724	7.33	-0.01
16:33	3.058	7.33	-0.01
16:33	3.391	7.33	-0.01
16:33	3.724	7.33	-0.01
16:34	4.058	7.33	-0.01
16:34	4.391	7.33	-0.01
16:34	4.724	7.33	-0.01
16:35	5.058	7.33	-0.01
16:35	5.391	7.33	-0.01
16:35	5.724	7.33	-0.01
16:36	6.058	7.33	-0.01
16:36	6.391	7.33	-0.01
16:36	6.724	7.33	-0.01
16:37	7.058	7.33	-0.01
16:37	7.391	7.33	-0.01
16:37	7.724	7.33	-0.01
16:38	8.058	7.33	-0.01
16:38	8.391	7.34	-0.02
16:38	8.724	7.34	-0.02
16:39	9.058	7.34	-0.02
16:39	9.391	7.33	-0.01
16:39	9.724	7.34	-0.02
16:40	10.058	7.34	-0.02

16:42	12.153	7.33	-0.01
16:44	14.153	7.33	-0.01
16:46	16.423	7.34	-0.02
16:48	18.762	7.34	-0.02
16:50	20.193	7.34	-0.02
16:52	22.193	7.34	-0.02
16:54	24.193	7.34	-0.02
16:56	26.193	7.34	-0.02
16:58	28.193	7.34	-0.02
17:00	30.193	7.34	-0.02
17:02	32.193	7.34	-0.02
17:04	34.158	7.35	-0.03
17:06	36.158	7.35	-0.03
17:08	38.158	7.35	-0.03
17:10	40.158	7.35	-0.03
17:12	42.158	7.35	-0.03
17:14	44.158	7.35	-0.03
17:16	46.158	7.35	-0.03
17:18	48.158	7.35	-0.03
17:20	50.158	7.35	-0.03
17:22	52.158	7.35	-0.03
17:24	54.158	7.35	-0.03
17:26	56.158	7.35	-0.03
17:28	58.158	7.35	-0.03
17:30	60.158	7.35	-0.03
17:32	62.247	7.35	-0.03
17:34	64.135	7.35	-0.03
17:36	66.135	7.35	-0.03
17:38	68.135	7.35	-0.03
17:40	70.135	7.35	-0.03
17:42	72.135	7.35	-0.03
17:44	74.135	7.35	-0.03
17:46	76.135	7.35	-0.03
17:48	78.135	7.35	-0.03
17:50	80.782	7.35	-0.03
17:52	82.182	7.35	-0.03
17:54	84.070	7.35	-0.03
17:56	86.070	7.36	-0.04
17:58	88.070	7.35	-0.03
18:00	90.070	7.36	-0.04
18:02	92.070	7.36	-0.04
18:04	94.070	7.36	-0.04
18:06	96.070	7.36	-0.04
18:08	98.115	7.36	-0.04
18:10	100.120	7.36	-0.04
18:30	120.280	7.37	-0.05
18:50	140.220	7.37	-0.05
19:10	160.220	7.35	-0.03
19:30	180.220	7.35	-0.03
20:10	220.500	7.34	-0.02
20:30	240.270	7.34	-0.02
20:50	260.330	7.33	-0.01
21:10	280.330	7.32	0.00
21:30	300.230	7.32	0.00
21:50	320.280	7.32	0.00
22:10	340.320	7.30	0.02

22:30	360.300	7.29	0.03
22:50	380.270	7.28	0.04
23:10	400.270	7.27	0.05
23:30	420.270	7.26	0.06
23:50	440.270	7.25	0.07
00:10	460.270	7.24	0.08
00:30	480.270	7.24	0.08
00:50	500.270	7.23	0.09
01:10	520.270	7.22	0.10
01:30	540.220	7.21	0.11
01:50	560.230	7.21	0.11
02:10	580.230	7.21	0.11
02:30	600.230	7.20	0.12
02:50	620.230	7.19	0.13
03:10	640.230	7.20	0.12
03:30	660.230	7.19	0.13
03:50	680.230	7.18	0.14
04:10	700.180	7.17	0.15
04:30	720.320	7.17	0.15
04:50	740.280	7.17	0.15
05:10	760.280	7.16	0.16
05:30	780.280	7.16	0.16
05:50	800.320	7.15	0.17
06:10	820.320	7.15	0.17
06:30	840.320	7.15	0.17
06:50	860.320	7.14	0.18
07:10	880.320	7.14	0.18
07:30	900.320	7.14	0.18
07:50	920.320	7.14	0.18
08:10	940.320	7.14	0.18
08:30	960.320	7.14	0.18
08:50	980.320	7.14	0.18
10:10	1060.500	7.14	0.18
11:10	1120.200	7.15	0.17
12:10	1180.200	7.18	0.14
13:10	1240.200	7.21	0.11
14:10	1300.200	7.26	0.06
15:10	1360.200	7.30	0.02
16:10	1420.200	7.31	0.01
17:10	1480.200	7.35	-0.03
18:10	1540.100	7.37	-0.05
19:10	1600.300	7.37	-0.05
20:10	1660.300	7.37	-0.05
21:10	1720.300	7.36	-0.04
22:10	1780.200	7.35	-0.03
23:10	1840.200	7.32	0.00
00:10	1900.200	7.30	0.02
01:10	1960.300	7.28	0.04
02:10	2020.300	7.27	0.05
03:10	2080.200	7.25	0.07
04:10	2140.200	7.23	0.09
05:10	2200.200	7.22	0.10
06:10	2260.200	7.21	0.11
07:10	2320.200	7.20	0.12
08:10	2380.300	7.19	0.13
09:10	2440.200	7.17	0.15

10:10	2500.300	7.17	0.15
11:10	2560.300	7.17	0.15
12:10	2620.300	7.15	0.17
13:10	2680.300	7.11	0.21
14:10	2740.200	7.08	0.24
15:10	2800.200	7.07	0.25
16:10	2860.300	7.05	0.27
17:10	2920.200	7.02	0.30
18:10	2980.200	7.00	0.32
19:10	3040.200	6.98	0.34
20:10	3100.200	6.98	0.34
21:10	3160.200	6.97	0.35
22:10	3220.200	6.96	0.36
23:10	3280.200	6.95	0.37
00:10	3340.200	6.94	0.38
01:10	3400.200	6.93	0.39
02:10	3460.200	6.92	0.40
03:10	3520.200	6.91	0.41
04:10	3580.200	6.90	0.42
05:10	3640.200	6.89	0.43
06:10	3700.200	6.89	0.43
07:10	3760.400	6.89	0.43
08:10	3820.200	6.89	0.43
09:10	3880.200	6.89	0.43
10:10	3940.200	6.88	0.44
11:10	4000.200	6.88	0.44
12:10	4060.300	6.91	0.41
13:10	4120.200	6.92	0.40
14:10	4180.200	6.95	0.37
15:10	4240.300	6.98	0.34
16:10	4300.200	7.02	0.30
16:59	4349.700	7.02	0.30

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 3-4 Run #2
TEST TYPE : RECOVERY
WELL NUMBER : REI 3-3 INPUT 7
RADIUS: NOT AVAILABLE
START DATE : 21-Aug-86
START TIME : 16:59
WATER START LEVEL: 7.32 FEET
WATER STOP LEVEL: 7.02 FEET
TOTAL PUMPING TIME: 4349.7 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:59	0.084	7.02	0.00	0.30
16:59	0.167	7.02	0.00	0.30
16:59	0.251	7.02	0.00	0.30
16:59	0.334	7.02	0.00	0.30
16:59	0.417	7.02	0.00	0.30
16:59	0.501	7.02	0.00	0.30
16:59	0.584	7.02	0.00	0.30
16:59	0.667	7.02	0.00	0.30
16:59	0.751	7.02	0.00	0.30
16:59	0.834	7.02	0.00	0.30
16:59	0.917	7.02	0.00	0.30
17:00	1.001	7.02	0.00	0.30
17:00	1.389	7.02	0.00	0.30
17:00	1.723	7.02	0.00	0.30
17:01	2.056	7.02	0.00	0.30
17:01	2.389	7.02	0.00	0.30
17:01	2.723	7.02	0.00	0.30
17:02	3.056	7.02	0.00	0.30
17:02	3.389	7.02	0.00	0.30
17:02	3.723	7.02	0.00	0.30
17:03	4.056	7.02	0.00	0.30
17:03	4.389	7.02	0.00	0.30
17:03	4.723	7.02	0.00	0.30
17:04	5.056	7.02	0.00	0.30
17:04	5.389	7.02	0.00	0.30
17:04	5.723	7.02	0.00	0.30
17:05	6.056	7.02	0.00	0.30
17:05	6.389	7.02	0.00	0.30
17:05	6.723	7.02	0.00	0.30
17:06	7.056	7.02	0.00	0.30
17:06	7.389	7.02	0.00	0.30
17:06	7.723	7.02	0.00	0.30
17:07	8.056	7.02	0.00	0.30
17:07	8.389	7.02	0.00	0.30
17:07	8.723	7.02	0.00	0.30
17:08	9.056	7.02	0.00	0.30
17:08	9.389	7.02	0.00	0.30
17:08	9.723	7.02	0.00	0.30

17:09	10.056	7.02	0.00	0.30
17:11	12.165	7.02	0.00	0.30
17:13	14.495	7.02	0.00	0.30
17:15	16.165	7.02	0.00	0.30
17:17	18.165	7.02	0.00	0.30
17:19	20.203	7.02	0.00	0.30
17:21	22.203	7.02	0.00	0.30
17:23	24.225	7.02	0.00	0.30
17:25	26.225	7.02	0.00	0.30
17:27	28.225	7.02	0.00	0.30
17:29	30.225	7.02	0.00	0.30
17:31	32.225	7.02	0.00	0.30
17:33	34.225	7.02	0.00	0.30
17:35	36.225	7.02	0.00	0.30
17:37	38.225	7.02	0.00	0.30
17:39	40.225	7.01	0.01	0.31
17:41	42.225	7.01	0.01	0.31
17:43	44.225	7.01	0.01	0.31
17:45	46.225	7.02	0.00	0.30
17:47	48.225	7.01	0.01	0.31
17:49	50.225	7.01	0.01	0.31
17:51	52.225	7.01	0.01	0.31
17:53	54.225	7.01	0.01	0.31
17:55	56.225	7.01	0.01	0.31
17:57	58.225	7.01	0.01	0.31
17:59	60.225	7.01	0.01	0.31
18:01	62.225	7.01	0.01	0.31
18:03	64.225	7.01	0.01	0.31
18:05	66.225	7.01	0.01	0.31
18:07	68.225	7.01	0.01	0.31
18:09	70.225	7.01	0.01	0.31
18:11	72.225	7.01	0.01	0.31
18:13	74.225	7.01	0.01	0.31
18:15	76.225	7.01	0.01	0.31
18:17	78.225	7.01	0.01	0.31
18:19	80.225	7.01	0.01	0.31
18:21	82.225	7.01	0.01	0.31
18:23	84.225	7.01	0.01	0.31
18:25	86.225	7.01	0.01	0.31
18:27	88.225	7.01	0.01	0.31
18:29	90.225	7.00	0.02	0.32
18:31	92.225	7.00	0.02	0.32
18:33	94.225	7.00	0.02	0.32
18:35	96.225	7.00	0.02	0.32
18:37	98.225	7.00	0.02	0.32
18:39	100.230	7.00	0.02	0.32
18:59	120.230	6.99	0.03	0.33
19:19	140.230	6.99	0.03	0.33
19:39	160.230	6.98	0.04	0.34
19:59	180.220	6.98	0.04	0.34
20:19	200.220	6.98	0.04	0.34
20:39	220.220	6.98	0.04	0.34
20:59	240.220	16.89	-9.87	9.57
21:19	260.220	16.90	-9.88	9.58
21:39	280.120	16.91	-9.89	9.59
21:59	300.120	16.91	-9.89	9.59

Appendix 17

Neuman and Witherspoon (1972) Method Reference

Field Determination of the Hydraulic Properties of Leaky Multiple Aquifer Systems

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Abstract. A new field method is proposed for determining the hydraulic properties of aquifers and aquitards in leaky systems. Conventional methods of analyzing leaky aquifers usually rely on drawdown data from the pumped aquifer alone. Such an approach is not sufficient to characterize a leaky system; our new method requires observation wells to be placed not only in the aquifer being pumped but also in the confining layers (aquitards) above and/or below. The ratio of the drawdown in the aquitard to that measured in the aquifer at the same time and the same radial distance from the pumping well can be used to evaluate the hydraulic properties of the aquitard. The new method is supported by theory and has been applied to the coastal groundwater basin of Oxnard, California. The field results are in good agreement with laboratory measurements.

Traditionally, groundwater hydrologists have tended to focus their attention on the more permeable aquifer layers of a groundwater basin in developing water supplies. However, sedimentary groundwater basins usually consist of a series of aquifers separated by confining layers of relatively low permeability, which may act as conduits for the vertical migration of water from one aquifer to another. Since fine-grained sediments often tend to be much more compressible than associated coarse-grained aquifer materials, they also can release large quantities of water from storage and thereby increase the supply available to the aquifer. The combined effects of these phenomena are known as leakage.

Usually, when the effects of leakage can be detected by observing drawdown in the aquifer being pumped, the confining beds are called 'aquitards,' and the aquifer is referred to as being 'leaky.' When such effects cannot be easily detected in the aquifer, the confining beds are called 'aquicludes,' and the aquifer is termed 'slightly leaky' [*Neuman and Witherspoon*, 1968].

Aquitards play an important role in the hydrology of multiple aquifer systems, and we shall mention here only a few examples. Although groundwater recharge is often believed to occur in areas of aquifer outcrops, *Gill* [1969] has recently reported that substantial amounts of water produced from the Potomac-Raritan-Magothy aquifer system are coming through the aquitards. Earlier, *Walton* [1965] had shown how the Maquoketa formation in Illinois, which is essentially a shale bed, serves as an effective transmitter of water between aquifers. Land subsidence in the San Joaquin Valley and other areas in California has been shown to be associated with water withdrawal from multiple aquifer systems and is generally attributed to the resulting compaction of fine-grained aquitard sediments [*Poland and Davis*, 1969]. Similar situations exist in Venice, Japan, and other parts of the world.

For the past 20 years, aquifers at depths below 500 feet have been used for storing natural gas in the United States and Europe. Where the properties of the aquitards were not properly investigated, the gas industry has on occasion witnessed the spectacular and dangerous effects of gas leakage. The storage of other fluids as well as the disposal of waste products underground, requires the role of aquitards to be thoroughly understood if the degradation of groundwater supplies and the pollution of the surface environment are to be avoided. The role of aquitards may also be important in determining the rate at which the seawater from a degraded aquifer may migrate vertically to an uninvaded zone. An interesting situation in which the effectiveness of aquitards in preventing seawater intrusion is largely unknown occurs where the construction of shallow harbors and marinas requires the removal of a part of the aquitard that normally provides a natural barrier between the ocean and the freshwater aquifer beneath [*California Department of Water Resources*, 1971, p. 10].

Although the importance of aquitards is being recognized more and more, there is no reliable method for their investigation, and very little is known about their hydraulic properties. This report describes an improved field method for evaluating the hydraulic properties of aquifers and aquitards in leaky multiple aquifer systems. The new approach is simple to use and applicable to a wide range of hydrogeological situations. We shall describe in detail one particular investigation performed in the coastal groundwater basin of Oxnard, California.

PROBLEMS IN ANALYZING PUMPING TESTS WITH CURRENT METHODS

In analyzing results of water pumping tests the well-known *Theis* [1935] solution is often used to determine the permeability and the specific storage of the aquifer under investigation. As long as the aquitards do not leak significant amounts of water into the aquifer, this method of analysis produces reliable results.

However, groundwater hydrologists noted many years ago that deviations from the aquifer behavior, as predicted by the Theis solution, are not uncommon. These deviations are often caused by water leaking out of the confining beds, and this led to the 'leaky aquifer' theory of *Hantush and Jacob* [1955]. This theory and its later modifications [*Hantush*, 1960] relied only on an examination of aquifer behavior and attempted to relate such behavior to the properties of the adjacent aquitards.

Unfortunately, this approach has not been entirely satisfactory. As has recently been pointed out by *Neuman and Witherspoon* [1969*b*], field methods based on the leaky aquifer theory of *Hantush and Jacob* [1955] may often lead to significant errors. These errors are such that one tends to overestimate the permeability of the aquifer and underestimate the permeability of the confining beds. Under some circumstances, one may also get the false impression that the aquifer is inhomogeneous. Furthermore, the method does not provide a means of distinguishing whether the leaking beds lie above or below the aquifer being pumped.

A new theory of flow in multiple aquifer systems has recently been developed by *Neuman and Witherspoon* [1969*a*; *California Department of Water Resources*, 1971, pp. 24–38]. This theory shows that the behavior of drawdown in each layer is a function of several dimensionless parameters β_i, and r/B_{ij}, which depend on the hydraulic characteristics of the aquitards as well as those of the aquifers. The new theory clearly indicates that the observation of drawdown in the pumped aquifer alone is not always sufficient to determine uniquely the values of β and r/B. For example, *Hantush's* [1960] modified theory of leaky aquifers provides an analytical solution in terms of β that we know is applicable at sufficiently small values of time. Nevertheless, since this solution relates only to drawdown in the aquifer being pumped, its usefulness in determining uniquely the properties of each aquitard or even in determining a unique value of β is very limited [*California Department of Water Resources*, 1971, p. 327; *Riley and McClelland*, 1970]. Our theory indicates that one should be able to develop improved methods of analysis by installing observation wells not only in the aquifer being pumped but also in the confining layers enclosing it. Indeed, as will be shown later, a series of observation wells in more than one layer is a prerequisite for any reliable evaluation of aquitard characteristics.

The idea of placing observation wells in a low permeability layer (aquiclude) overlying a slightly leaky aquifer was originally proposed by *Witherspoon et al.* [1962] in connection with the underground storage of natural gas in aquifers. Their purpose was to determine how effective a given aquiclude would be in preventing gas leakage from the intended underground storage reservoir. Using results obtained from a finite difference simulation model, Witherspoon et al. were able to suggest a method for evaluating the hydraulic diffusivity of an aquiclude by means of a pumping test.

Later, a theoretical analysis of flow in aquicludes adjacent to slightly leaky aquifers was developed by *Neuman and Witherspoon* [1968]. This theory led to an improved method for determining the hydraulic diffusivity of aquicludes under slightly leaky conditions [*Witherspoon and Neuman*, 1967; *Witherspoon et al.*, 1967, pp. 72–92]. Since the method relies on the ratio between drawdown in the aquiclude and drawdown in the pumped aquifer, it will henceforth be referred to as the 'ratio method.'

A method for evaluating the hydraulic diffusivity of an aquitard under arbitrary conditions of leakage, which also uses observation wells completed in the confining layer itself, was recently described by *Wolff* [1970]. In his analysis Wolff assumed that, at any given radial distance from the pumping well and at a sufficiently large value of time, one can represent drawdown in the pumped aquifer by a step function. Assuming also that drawdown in the unpumped aquifer remains 0, Wolff arrived at a set of type curves that he recommended for aquitard evaluation.

Although this method gave satisfactory results for the particular site investigated by Wolff, we think that the step function approach may lead to difficulties when it is applied to arbitrary multiple aquifer systems. Fundamentally, drawdown in the pumped aquifer cannot be reliably represented by a single step function unless a quasi-steady state is reached within a sufficiently short period of time. The quasi-steady state will be reached only if the transmissibility of the aquifer is large and if the observation wells are situated at relatively small radial distances from the pumping well. To minimize the effect of early drawdowns, Wolff's method further requires that the duration of the pumping test be sufficiently long and that the vertical distance between the pumped aquifer and the aquitard observation wells not be too small.

From our new theory of flow in multiple aquifer systems, we now know that at large values of time the results in the aquitard may be affected significantly by the influence of an adjacent unpumped aquifer, especially where the aquitard observation well has been perforated close to such an aquifer. Thus, although the single step function approach renders the method inapplicable at small values of time, the assumption of zero drawdown in the unpumped aquifer introduces an additional restriction at large values of time.

In the special case where the thickness of the aquitard is known, one can determine its diffusivity directly from the step function type curves without the need for graphical curve matching. Quite often, however, the effective thickness of the aquitard is unknown. For example, the aquitard may contain unidentified or poorly defined layers of highly permeable material that act as a buffer to the pressure transient and also as a source of leakage. Another possibility is that the aquitard is situated below the pumped aquifer and that its lower limit has never been adequately defined. Then the step function approach requires the graphical matching of aquitard drawdown data with *Wolff's* [1970] type curves.

However, the intermediate parts of these type curves are essentially parallel, and therefore they cannot be matched uniquely with field results. On the other hand, neither the early nor the late parts of the type curves can be used with confidence. Thus there may be a significant element of uncertainty when *Wolff's* [1970] method is applied to real field situations.

Since the currently available direct field methods appear to be limited in their application, there is an obvious need for a new approach that would enable one to determine the characteristics of multiple aquifer systems under a wide variety of field conditions. We shall attempt to demonstrate that a rational basis for such an approach is provided by our new theory of flow in multiple aquifer systems [*Neuman and Witherspoon*, 1969*a*]. We will start by showing that the ratio method, which we originally thought was limited in application only to aquicludes under slightly leaky conditions, can in fact also be used to evaluate the properties of aquitards under very leaky conditions.

APPLICABILITY OF THE RATIO METHOD TO LEAKY CONDITIONS

To develop a method for determining the hydraulic properties of aquitards, we shall first consider a two-aquifer system (Figure 1). A complete solution for the distribution of drawdown in such a system has been developed by *Neuman and Witherspoon* [1969*a*]. In each aquifer the solutions depend on five dimensionless parameters β_{11}, r/B_{11}, β_{21}, r/B_{21}, and t_{D_1}. In the aquitard the solution involves one additional parameter z/b_1'. This large number of dimensionless parameters makes it practically impossible to construct a sufficient number of type curves to cover the entire range of values necessary for field application. For a set of type curves to be useful, they are normally expressed in terms of not more than two independent dimensionless parameters.

One way to significantly reduce the number of parameters is to restrict the analysis of field data to small values of time. In particular, we want to focus our attention on those early effects that occur prior to the time when a discernible pressure transient reaches the unpumped aquifer. At such early times the unpumped aquifer does not exert any influence on the rest of the system, and therefore drawdowns are independent of the parameters β_{21} and r/B_{21}. Furthermore, the aquitard behaves as if its thickness were infinite, which simply means that the parameters r/B_{11} and z/b_1' also have no influence on the drawdown. Thus the resulting equation will depend only on β_{11}, t_{D_1}, and an additional parameter t_{D_1}'.

In the pumped aquifer, drawdown is then given by *Hantush*'s [1960] asymptotic equation [*Neuman and Witherspoon*, 1969*a*].

$$s_1(r, t) = \frac{Q_1}{4\pi T_1} \int_{1/4t_{D_1}}^{\infty} \frac{e^{-y}}{y} \cdot \operatorname{erfc}\left(\frac{\beta_{11}}{[y(4t_{D_1}y - 1)]^{1/2}}\right) dy \qquad (1)$$

In the aquitard the solution is

$$s_1'(r, z, t) = \frac{Q_1}{4\pi T_1} \int_{1/4t_{D_1}}^{\infty} \frac{e^{-y}}{y} \cdot \operatorname{erfc}\left(\frac{\beta_{11} + y(t_{D_1}/t_{D_1}')^{1/2}}{[y(4t_{D_1}y - 1)]^{1/2}}\right) dy \qquad (2)$$

Theoretically, (1) and (2) are limited to those small values of time that satisfy the criterion

$$t_{D_1} \leq 1.6\beta_{11}^2/(r/B_{11})^4 \qquad (3)$$

In terms of real time this criterion may also be

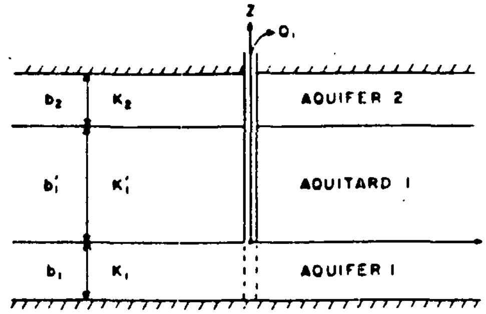

Fig. 1. A schematic diagram of a two-aquifer system.

expressed by

$$t \leq 0.1 S_{s_1}' b_1'^2/K_1' \qquad (4)$$

indicating that the limiting value of time is independent of the radial distance from the pumping well.

From a practical standpoint the criterion given by (3) or (4) is overly conservative. For example, Figures 2–8 in *Neuman and Witherspoon* [1969*a*] reveal that the effect of the unpumped aquifer is felt in the rest of the system at times that are always greater than those predicted by (3). Note further that in these figures the effects of β_{21} and r/B_{21} are negligible as long as the log-log curve of drawdown versus time for the unpumped aquifer does not depart from its initial steep slope.

This effect of the unpumped aquifer provides a useful criterion for determining the time limit beyond which the asymptotic solutions may no longer be applicable. If an observation well can be provided in the unpumped aquifer, a log-log plot of drawdown versus time should enable the hydrologist to identify this time limit.

Note that there may be field situations in which the procedure above is not applicable. For example, when the transmissibility of the unpumped aquifer is large in comparison to that of the aquifer being pumped, drawdowns in the unpumped aquifer will be too small to measure, and one would not be able to determine the time limit as outlined above. This procedure may also fail when the water levels in the unpumped aquifer are fluctuating during the pumping test owing to some uncontrolled local or regional effect. Then a more conservative estimate of the time limit can be established from drawdown data observed in one of the aquitard wells. In general, the smaller the vertical distance between the perforated interval in the aquitard well and the boundary of the pumped aquifer is, the more conservative the time indicated by the procedure above is.

Having established a practical method for estimating the time within which (1) and (2) are valid, we can now proceed to show how these equations lead to the ratio method for evaluating aquitards. Remember that Hantush's equation does not by itself lead to a reliable method for determining a unique value of β_{11} from field results. The same can be said of (2), because it involves three independent parameters β_{11}, t_{D_1}, and t_{D_1}'. However, the usefulness of these two equations becomes immediately evident when one considers s_1'/s_1, i.e., the ratio of drawdown in the aquitard to that in the pumped aquifer at the same elapsed time and the same radial distance from the pumping well.

In the discussion that follows we shall be dealing with only one aquifer and one aquitard, and for the sake of simplicity we shall omit all subscripts. Figure 2 shows the variation of s'/s versus t_D' for a practical range of t_D and β values. Note that at $t_D = 0.2$ changing the value of β from 0.01 to 1.0 has practically no effect on the ratio s'/s. The same is true as t_D increases, and this relationship is shown by the additional results for $t_D = 10^4$.

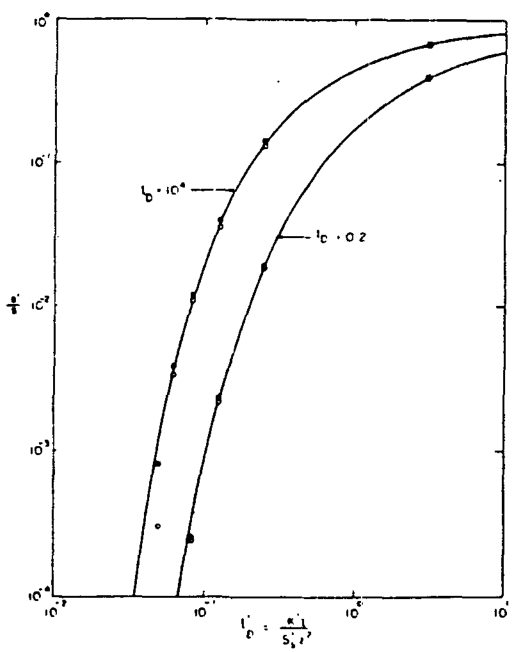

Fig. 2. The variation of s'/s with t_D' for $\beta = 0.0$ (solid lines), $\beta = 0.01$ (squares), and $\beta = 1.0$ (circles).

If we now use our theory for slightly leaky situations [*Neuman and Witherspoon*, 1968] where s' is given by

$$s'(r, z, t) = \frac{Q}{4\pi T} \frac{2}{\pi^{1/2}} \cdot \int_{1/(4t_D')^{1/2}}^{\infty} - \mathrm{Ei}\left(-\frac{t_D' y^2}{t_D(4t_D' y^2 - 1)}\right) e^{-y^2}\, dy \tag{5}$$

and s is obtained from the Theis solution, we have in effect the special case where $\beta = 0$. This is represented by the two solid lines in Figure 2.

We also examined the case where $\beta = 10.0$ and found that the values of s'/s deviate significantly from those shown in Figure 2. Thus one may conclude that for all practical values of t_D the ratio s'/s is independent of β as long as β is of order 1.0 or less. Since β is directly proportional to the radial distance from the pumping well, its magnitude can be kept within any prescribed bounds simply by placing the observation wells close enough to the pumping well. A quick calculation will show that distances of the order of a few hundred feet will be satisfactory for most field situations.

Thus we arrive at the very important conclusion that the ratio method, which we originally thought was restricted to only slightly leaky situations, can in effect be used to determine the hydraulic diffusivities of aquitards under arbitrary leaky conditions. We therefore decided to adopt the ratio method as a standard tool for evaluating the properties of aquitards.

USE OF THE RATIO METHOD IN AQUITARD EVALUATION

The ratio method can be applied to any aquifer and its adjacent aquitards, above and below, in a multiple aquifer system (see sketch in Figure 3). The method relies on a family of curves of s'/s versus t_D', each curve corresponding to a different value of t_D as obtained from (5) and the Theis equation. The curves in Figure 3 have been prepared from tables of values published previously by *Witherspoon et al.* [1967, Appendix G].

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y

$$\frac{2}{\pi^{1/2}}$$

$$\left(-\frac{t_D' y^2}{t_D(4t_D' y^2 - 1)}\right) e^{-y^2} dy \qquad (5)$$

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eviously by *Witherspoon et*
G].

In the ratio method, one first calculates the value of s'/s at a given radial distance from the pumping well r and at a given instant of time t. The next step is to determine the magnitude of t_D for the particular values of r and t at which s'/s has been measured. When $t_D < 100$, the curves in Figure 3 are sensitive to minor changes in the magnitude of this parameter, and therefore a good estimate of t_D is desirable. When $t_D > 100$, these curves are so close to each other that they can be assumed to be practically independent of t_D. Then even a crude estimate of t_D will be sufficient for the ratio method to yield satisfactory results. A procedure for determining the value of t_D from drawdown data in the aquifer will be discussed later in connection with methods dealing with aquifer characteristics.

Having determined which one of the curves in Figure 3 should be used in a given calculation, one can now read off a value of t_D' corresponding to the computed ratio of s'/s. Finally, the diffusivity of the aquitard is determined from the simple formula

$$\alpha' = (z^2/t)t_D' \qquad (6)$$

Note in Figure 3 that, when $s'/s < 0.1$, the value of t_D' obtained by the ratio method is not very sensitive to the magnitude of s'/s. As a result the value of α' calculated from (6) depends very little on the actual magnitude of the drawdown in the aquitard. Instead, the critical quantity determining the value of α' at a given elevation z is the time lag t between the start of the test and the time when the aquitard observation well begins to respond. The time lag is very important because in using the ratio method one need not worry about having extremely sensitive measurements of drawdown in the aquitard observation wells. A conventional piezometer with a standing water column will usually give sufficiently accurate information for most field situations. The time lag between a change in pressure and the corresponding change in water level in the column is usually so small in comparison to the time lag between the start of the test and this change in pressure that its influence can be safely ignored.

To evaluate the permeability and specific storage of an aquitard from its hydraulic diffusivity, one of these quantities must first be determined by means other than the ratio

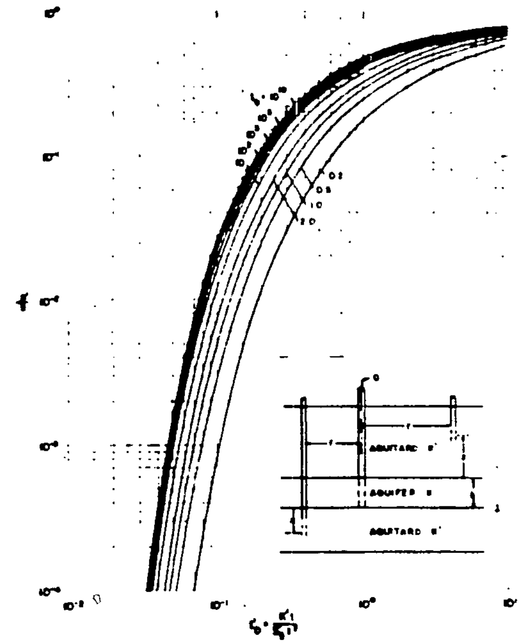

Fig. 3. The variation of s'/s with t_D' for a semi-infinite aquitard.

method. Experience indicates that permeability may vary by several orders of magnitude from one aquitard to another and even from one elevation to another in the same aquitard. A much more stable range of values is usually encountered when one is dealing with specific storage.

Recent field measurements in areas of land subsidence (F. S. Riley, personal communication, 1971) have shown that the specific storage of fine-grained sediments depends on the relationship between the load generated by pumping and the past history of loading. When this relationship is such that the sediments react elastically, the value of S_s' is relatively small. When the sediments are undergoing irreversible consolidation, the value of S_s' may be larger by 1 or 2 orders of magnitude. Presently, the most reliable measurements of S_s' are performed in the field by using borehole extensometers. Another way to determine approximate values of S_s' is to perform standard consolidation tests on core samples in the laboratory. In the total absence of field and laboratory measurements, S_s' can be estimated by correlating published results on similar sediments. Once the value of

S_s' has been determined, K' is easily calculated from $K' = \alpha' S_s'$.

We also studied the effects of aquitard heterogeneity and anisotropy on the value of K' obtained by the ratio method at a given elevation z. In our investigation we used the finite element method to examine the behavior of a two-aquifer system when: (1) the aquitard was a homogeneous anisotropic layer with a horizontal permeability as much as 250 times greater than the vertical and (2) the aquitard consisted of three different layers, each of which was homogeneous and anisotropic. The results of this study indicated that for homogeneous anisotropic aquitards the ratio method will always give a value of K' that corresponds to the vertical permeability of the aquitard. For a heterogeneous aquitard, K' is simply the weighted average vertical permeability over the thickness z. If there are N layers of thickness b'' and vertical permeability K_n'' inside this interval, K' represents the average value

$$K' = z \Big/ \left(\sum_{n=1}^{N} \frac{b''}{K_n''} \right) \qquad (7)$$

Boulton [1963] and *Neuman* [1972] have shown that, at early values of time, drawdown in an unconfined aquifer can safely be approximated by the Theis solution. At later values of time, drawdown is affected by the delayed response of the water table, and the effect is similar to that of leakage in a confined aquifer. Thus, if the ratio method is applicable to aquitards adjacent to confined leaky aquifers, it should also be applicable to situations in which the pumped aquifer is unconfined. This conclusion is further supported by the fact that the ratio method depends less on the actual values of drawdown in the aquifer than on the time lag observed in the aquitard. To test this applicability of the ratio method to an unconfined aquifer, we took data from *Wolff* [1970] for a pumping test in which observation wells were placed in a confining layer underneath a water table aquifer. We analyzed these data by using the ratio method, and the results are in excellent agreement with those obtained by Wolff.

When we showed that our slightly leaky theory was applicable to the so-called leaky aquifer, our previous discussion was restricted to a two-aquifer system. By now, however, the reader will recognize that such a restriction is not necessary and that the ratio method is actually applicable to arbitrary multiple aquifer systems. The only requirement is that the sum of the β_{ij} values with respect to the overlying and underlying aquitards be of order 1 or less.

In summary, note once again the following features of the ratio method.

1. The method applies to arbitrary, leaky multiple aquifer situations.
2. The pumped aquifer can be either confined or unconfined.
3. The confining layers can be heterogeneous and anisotropic. Then the ratio method gives the average vertical permeability over the thickness z of the aquitard being tested.
4. The method relies only on early drawdown data, and therefore the pumping test can be of relatively short duration.
5. The drawdown data in the unpumped aquifer or in the aquitard provide an in situ indication of the time limit at which the ratio method ceases to give reliable results.
6. Since the method is more sensitive to time lag than to the actual magnitude of s''s, the accuracy with which drawdowns are measured in the aquitard is not overly critical.
7. The method does not require prior knowledge of the aquitard thickness.
8. The ratio method is simple to use and does not involve any graphical curve-matching procedures. This lack of curve-matching procedures is an advantage because curve matching is often prone to errors due to individual judgment and because a more reliable result can be obtained by taking the arithmetic average of results from several values of the ratio s'/s.

METHOD FOR EVALUATING AQUIFERS

When the pumped aquifer is slightly leaky, one can evaluate its transmissibility and storage coefficient by the usual procedures based on the Theis equation. When leakage is appreciable, these procedures will not always yield satisfactory results. Alternative methods for analyzing the results of pumping tests in leaky aquifers were proposed by *Jacob* [1946] and *Hantush* [1956, 1960]. Still another method based on the r/B solution has recently been proposed by *Narasimhan* [1968]. All these methods rely on drawdown data from the pumped aquifer alone.

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EVALUATING AQUIFERS

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Their purpose is to determine not only the properties of the aquifer but also the so-called 'leakage factors' r/B and β that depend on the characteristics of the confining layers as well as on those of the aquifer. We have shown earlier that these methods have a limited application and that they can often lead to erroneous results.

Since we have introduced the ratio method as a means for evaluating aquitards, the only remaining unknowns to be determined are the aquifer transmissibility T and the storage coefficient S. When the aquifer is leaky, the use of methods based on the Theis solution will lead to errors whose magnitudes are a function of β and r/B. A look at *Neuman and Witherspoon* [1969*a*] will reveal that the smaller the values of β and r/B are, the less the drawdowns in the pumped aquifer deviate from the Theis solution, and therefore the smaller the errors introduced by such methods are. At this point we must recognize that β and r/B do not necessarily reflect the amount of water that leaks into the aquifer. In fact, both these parameters are directly proportional to r, which simply means that their magnitude in a given aquifer varies from nearly 0 at the pumping well to relatively large values further away from this well. Thus the extent to which leakage can affect the behavior of the drawdown in any given aquifer is a function of the radial distance from the pumping well. Thus the closer one is to this well, the smaller the deviations of drawdown from the Theis curve are. On the other hand, the rate of leakage is obviously greatest near the pumping well where the vertical gradients in the aquitard are largest and diminishes as the radial distance from this well increases. Therefore, in a given system, β and r/B increase with radial distance, whereas the actual rate of leakage decreases.

At first glance, we seem to be faced with a paradox: The greater the leakage is, the less the deviations from the nonleaky Theis solution are. However, a closer examination of the flow system will show that there is a simple physical explanation for this phenomenon. The reader will recognize that, although vertical gradients in the aquitard do not vary appreciably with radial distance from the pumping well, the same cannot be said about drawdown in a pumped aquifer. As a result the rate of leakage per unit area relative to this drawdown is negligibly small in the immediate vicinity of the pumping well but becomes increasingly important at larger values of r. In addition, the water that leaks into the aquifer at smaller values of r tends to act as a buffer to the pressure transient. This transient cannot propagate as fast as it otherwise might have had there been no increase in aquifer storage. The effect is to reduce further the drawdown at points farther away from the pumping well. The net result is a situation in which larger values of r are associated with less leakage but also with greater deviations from the Theis curve.

Thus we arrive at the important conclusion that one can evaluate the transmissibility and storage coefficient of a leaky aquifer by using conventional methods of analysis based on the Theis solution. The errors introduced by these methods will be small if the data are collected close to the pumping well, but they may become significant when the observation well is placed too far away. Therefore a distance drawdown analysis based on the Theis curve is not generally applicable to leaky aquifers and should be avoided whenever possible.

Ideally, the values of T and S should be evaluated by using drawdown or buildup data from the pumping well itself because here the effect of leakage is always the smallest. We recommend this approach whenever the effective radius of the pumping well is known (e.g., wells in hard rock formations). However, when a well derives its water from unconsolidated materials, its effective radius usually remains unknown owing to the presence of a gravel pack. In these situations the approach above can still be used to evaluate T but cannot be used to determine S.

As a general rule, early drawdown data are affected by leakage to a lesser degree than data taken at a later time are. Therefore we feel that in performing the analysis most of the weight should be given to the earliest data available, if, of course, there is confidence in their reliability.

Once S and T have been determined, one can calculate the dimensionless time at any given radial distance from the pumping well by

$$t_D = Tt/Sr^2 \qquad (8)$$

Equation 8 can then be used with the ratio method as we discussed earlier.

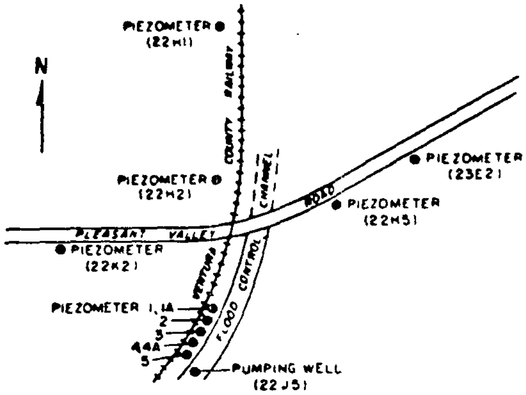


Fig. 4. The locations of the piezometers used in field pumping tests.

FIELD PUMPING TESTS IN THE OXNARD, CALIFORNIA, BASIN

The California Department of Water Resources had previously investigated the Oxnard basin in connection with seawater intrusion problems and constructed several wells at various locations in the basin. For our field studies we selected a particular location in the city of Oxnard where a large capacity pumping well (Figure 4, 22J5) was available to produce water from the Oxnard aquifer. Four additional piezometers (22H2, 22H5, 22K2, and 23E2) were available to monitor water levels in the Oxnard aquifer at radial distances of 502–1060 feet.

In addition, seven new piezometers were installed at various elevations relative to that of the Oxnard aquifer. Table 1 summarizes the vertical distances above or below the Oxnard for each piezometer and also gives the radial distances from pumping well 22J5. Ideally, the seven piezometers should have been arranged along a circular arc with its center at the pumping well so that responses would be given at various elevations but at only one unique value of r. However, this arrangement was not possible under the local conditions, and we therefore had to design the well field according to the scheme shown in Figure 4. For details of the construction, the completion, and the development methods, the reader is referred to *California Department of Water Resources* [1971, pp. 63–68].

The following is a brief description of the lithology in the vicinity of the test area. The semiperched zone is composed of fine- to medium-grained sand with interbedded silty clay lenses. The upper aquitard is made up of predominantly silty and sandy clays, mainly montmorillonite. The Oxnard aquifer, which is the most important water producer in the Oxnard basin, is composed of fine- to coarse-grained sand and gravel. Silty clay with some interbedded sandy clay lenses makes up the lower aquitard. The material that forms the Mugu aquifer is fine- to coarse-grained sand and gravel with some interbedded silty clay; Figure 5 shows an electric log through this series of sediments.

ANALYSIS OF PUMPING TEST RESULTS

Two pumping tests were performed in the field. Their purpose was to determine the hydraulic characteristics of the Oxnard aquifer and the confining layers above and below it and to confirm our theoretical concepts [*Neuman and Witherspoon*, 1969*a*] regarding the response of multiple aquifer systems to pumping.

The first pumping test lasted 31 days. Figure 6 shows the response in the Oxnard aquifer at

TABLE 1. Location of Piezometers

Piezometer	Distance from 22J5, feet	Depth, feet	Vertical Distance*, feet	Layer
1	100	120	...	Oxnard aquifer
1A	100	239	...	Mugu aquifer
2	91	225	−26	lower aquitard
3	81	205	−6	lower aquitard
4	72	95	+11	upper aquitard
4A	72	58.5	+50	semiperched aquifer
5	62	84	+22	upper aquitard

* The vertical distance is the distance above the top of the Oxnard aquifer at a depth of 105 feet or below the bottom at a depth of 198 feet.

† Failed to operate satisfactorily.

various radial distances from the pumping well. Piezometer 1, which is nearest to the pumping well, demonstrated an anomalous behavior during the first 6 min of pumping. This was apparently due to a surging effect in the pumping well. At about 6000 min the entire basin started experiencing a general drop in water levels probably due to the beginning of intermittent pumping for irrigation at this time of the year. Table 2 gives the values of T and S as calculated from these data by using *Jacob's* [1950] semilogarithmic approach.

Table 2 shows that in general the values of T become progressively larger as r increases. This relationship can be explained as follows. Since the Oxnard aquifer is obviously leaky, the actual drawdown curve at any given well will lie below the Theis solution, as is shown diagrammatically in Figure 7. To demonstrate this positioning, we shall choose a particular point on the data curve that corresponds to some given value of s and t. If we could match the data to the true type curve where β and r/B are not 0, we would obtain the true value of s_{D_1} for the point chosen.

However, such type curves were not available for this investigation, and we used a method that is essentially equivalent to matching the field data to the Theis curve. Therefore the field data are being shifted upward from their true position, and our chosen point will now indicate an apparent value of $s_{D_2} > s_{D_1}$.

From the definition of s_D it is clear that since s remains unchanged the value of T is increased. The greater the radial distance r, the larger β and r/B become, and therefore the larger the difference between the true type curve and the Theis curve is. In other words, as r increases, the magnitude of T should become more and more exaggerated, which is clearly evident in Table 2.

With regard to errors in S, the shifting of field data as indicated on Figure 7 may be either to the left or to the right. Thus the effect on the calculated values of S is not predictable (Table 2). With this unpredictability in mind, we decided to select the results from piezometer 1 of $T = 130{,}600$ gpd/ft and $S = 1.12 \times 10^{-4}$ as being most representative of the Oxnard aquifer, at least in the area of the pumping test.

Having estimated the properties of the pumped aquifer, we shall now consider the results from other parts of this three-aquifer

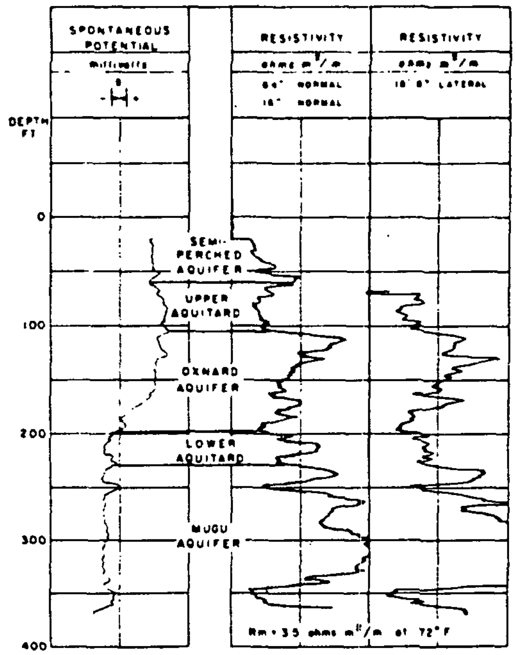


Fig. 5. The electric log from the first exploratory hole.

subsystem. Figure 8 shows the response at one particular point in the lower aquitard (well 3) as well as the responses in the Oxnard above (well 1) and the Mugu below (well 1A). Figure 9 shows the response at two different elevations in the upper aquitard (wells 4 and 5) as well as the response in the overlying semiperched aquifer (well 4A). Since piezometer 1 is located farthest from the pumping well, we do not have the response in the pumped aquifer directly below the piezometers where drawdowns in the upper aquitard were measured. However, from distance–drawdown curves in the Oxnard aquifer and from the behavior of piezometer 4, we concluded that the aquifer response was approximately as shown by the dashed curve in Figure 9. Remember that the ratio method for evaluating aquitards is more sensitive to the time lag than to the actual magnitude of drawdown in the aquifer. Therefore the dashed curve in Figure 9 can be considered sufficiently accurate for our purposes. Note that the shapes of the curves in Figures 8 and 9 are quite similar to those of our theoretical curves [*Neuman and Witherspoon*, 1969*a*].

To evaluate the lower aquitard, we shall determine the ratio s'/s at two early values of

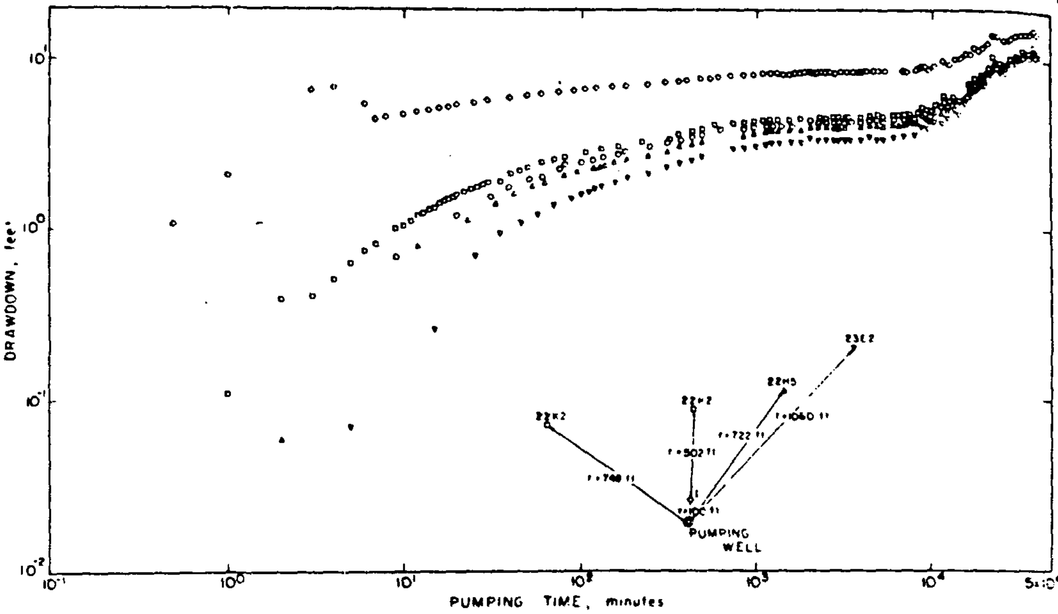


Fig. 6. The fluid levels in the Oxnard piezometers during the first pumping test. The diamonds represent well 1, the squares represent well 22H2, the triangles represent well 22H5, the circles represent well 22K2, and the inverted triangles represent well 23E2.

time, $t = 80$ min and $t = 200$ min. At $t = 80$ min, one can read on Figure 8 that $s' = 0.078$ and $s = 6.6$ feet. The ratio is simply $s'/s = 0.078/6.6 = 1.18 \times 10^{-2}$. To obtain t_D, one can use the equation

$$t_D = 9.28 \times 10^{-5} Tt/r^2 S \qquad (9)$$

where T is in gallons per day per foot, t is in minutes, and r is in feet. Then, using the known values of T and S and noting from Table 1 that, at piezometer 3, $r = 81$ feet, one can calculate

$$t_D = \frac{(9.28 \times 10^{-5})(130{,}600)(80)}{(81)^2(1.12 \times 10^{-4})} = 1.32 \times 10^3$$

TABLE 2. Results of Oxnard Aquifer Using Jacob's Semilog Method

Well	r, feet	T, gpd/ft	S
1	100	130,600	1.12×10^{-4}
22H2	502	139,000	3.22×10^{-4}
22H5	722	142,600	3.08×10^{-4}
22K2	748	136,700	2.48×10^{-4}
23E2	1060	157,000	2.53×10^{-4}

Referring to Figure 3, one finds that these values of s'/s and t_D correspond to $t_D' = 0.086$. From the definition of t_D', one can verify the formula

$$\alpha' = 1.077 \times 10^4 t_D' z^2/t \qquad (10)$$

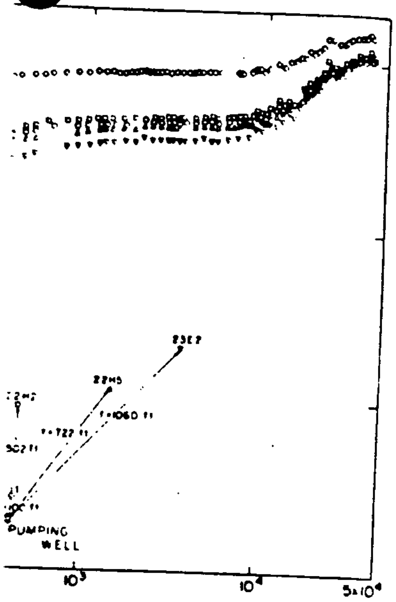
where α' is in gallons per day per foot, z is in feet, and t is in minutes. One notes from Table 1 that, for piezometer 3, $z = 6$ feet, and therefore

$$\alpha' = \frac{(1.077 \times 10^4)(0.086)(6)^2}{(80)} = 4.17 \times 10^2 \text{ gpd/ft}$$

Similarly, one finds that, at $t = 200$ min, $\alpha' = 3.39 \times 10^2$ gpd/ft. Since the method gives more reliable results when t is small, we adopted $\alpha' = 4.17 \times 10^2$ gpd/ft as the representative value for the top 6 feet of the lower aquitard. The results of similar calculations for both aquitards are summarized in Table 3. Note that the diffusivity of the Oxnard aquifer is

$$\alpha = \frac{T}{S} = \frac{130{,}600}{1.12 \times 10^{-4}} = 1.17 \times 10^9 \text{ gpd/ft}$$

which is more than 1 million times the values obtained for the aquitards.



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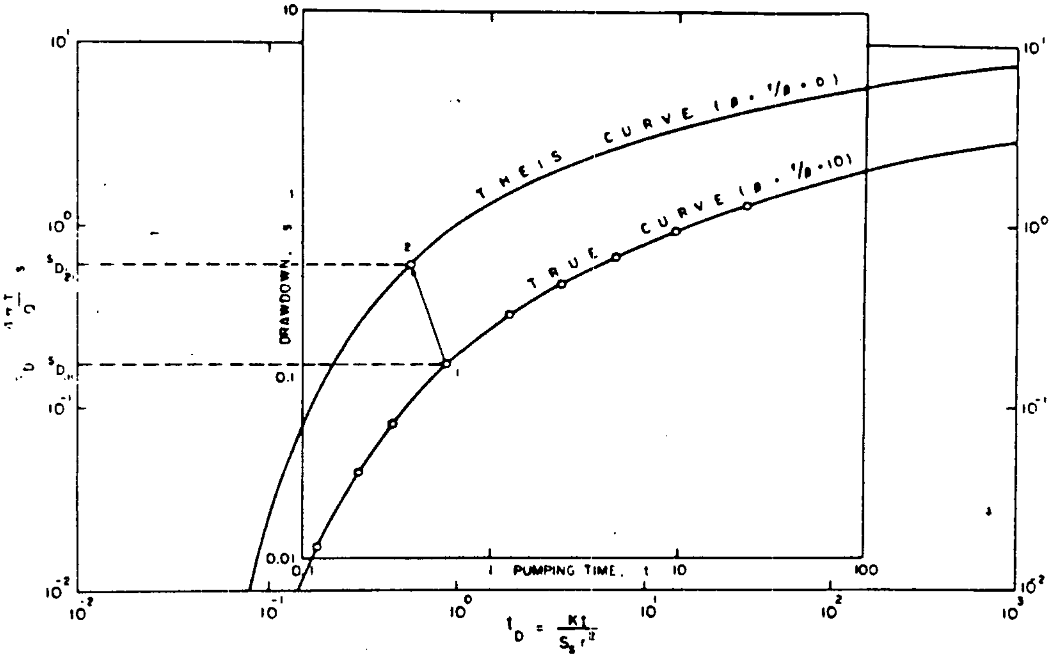

Fig. 7. A comparison of hypothetical field data with leaky and nonleaky type curves.

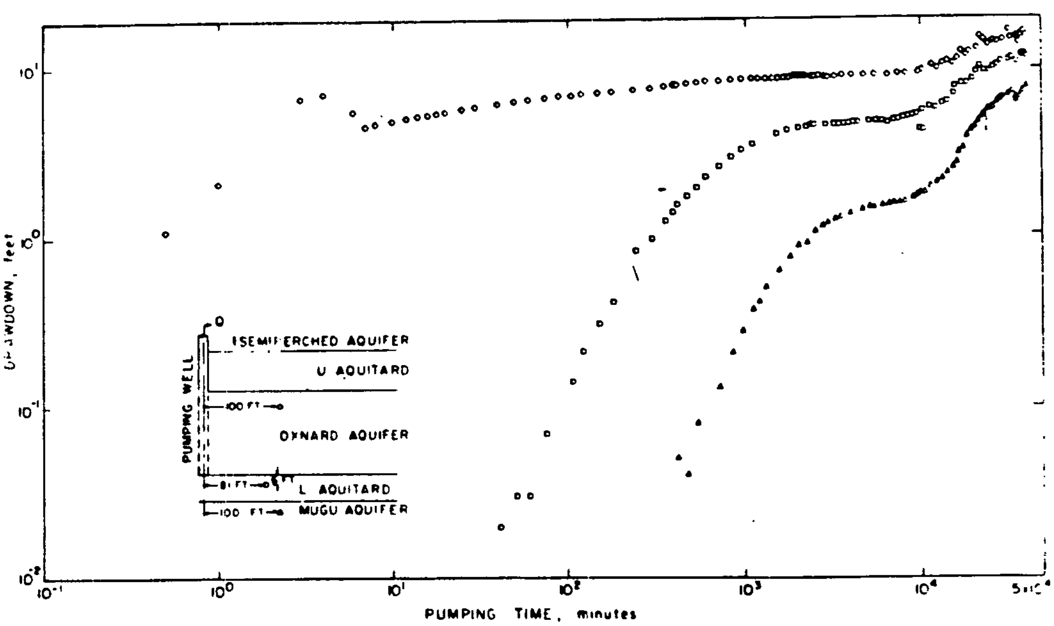

Fig. 8. The response of the piezometers in the lower aquitard (well 3, squares) to that in the Oxnard (well 1, diamonds) and Mugu (well 1A, triangles) aquifers during the first pumping test.

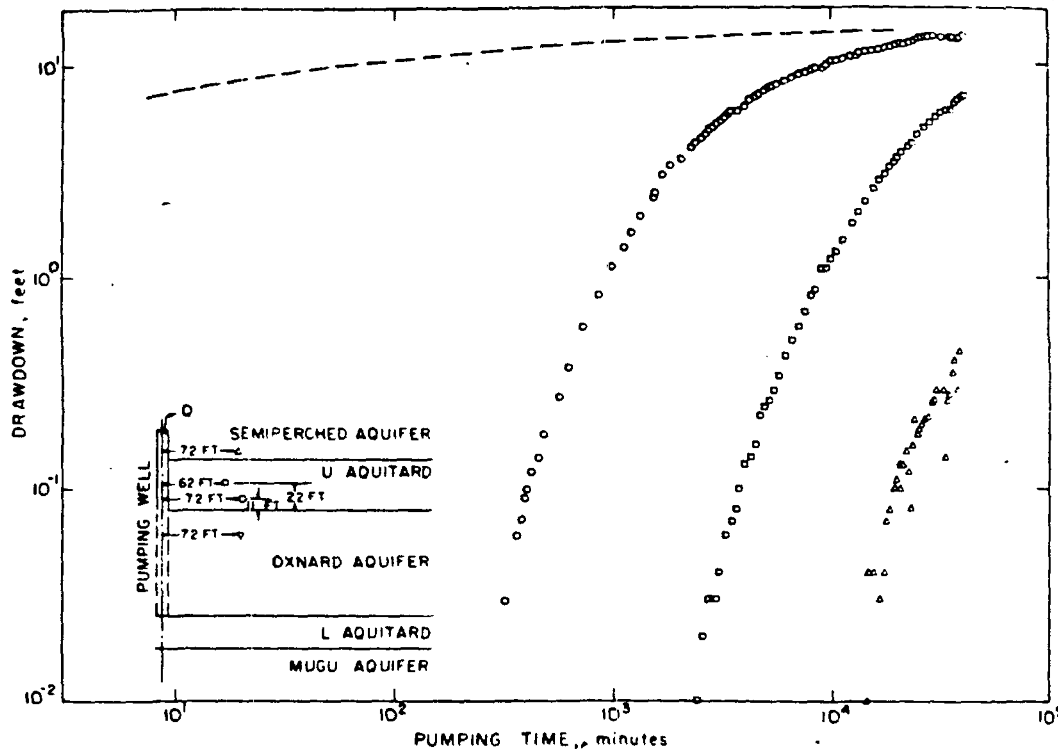

Fig. 9. The response of the piezometers in the upper aquitard (well 4, circles, and well 5, squares) and the semiperched aquifer (well 4A, triangles) during the first pumping test. The broken line indicates the probable response of the Oxnard aquifer at $r = 72$ feet.

The results of the second pumping test were essentially the same as those of the first test and will therefore not be presented here.

DETERMINATION OF AQUITARD PROPERTIES USING FIELD AND LABORATORY RESULTS

Having determined the hydraulic diffusivities, we can evaluate the permeability K' of each aquitard if the storage factor is known. The values of S_s' were calculated from consolidation

TABLE 3. Results for Hydraulic Diffusivity of Aquitards from First Pumping Test

Layer	Section Tested	K'/S_s', gpd/ft	K'/S_s', cm²/sec
Upper aquitard	bottom 22 feet	1.02×10^2	1.47×10^{-1}
Upper aquitard	bottom 11 feet	2.44×10^2	3.51×10^{-1}
Lower aquitard	top 6 feet	4.17×10^2	5.99×10^{-1}

tests performed in the laboratory [*California Department of Water Resources*, 1971, pp. 106–110] by using the formula

$$S_s' = a_v \gamma_w/(1 + e) \tag{11}$$

These values were then used to calculate K' according to

$$K' = \alpha' S_s' \tag{12}$$

and the results are summarized in Table 4.

Direct measurements performed on undisturbed samples in the laboratory indicated that the aquitard permeabilities vary within a range of at least 3 orders of magnitude. The results in Table 4 fall on the high side of this range and thus are an indication that the average permeability in the field cannot always be reliably estimated from laboratory measurements.

It is interesting to compare the specific storage and permeability of the aquitard with those of the Oxnard aquifer. Using an aquifer thickness

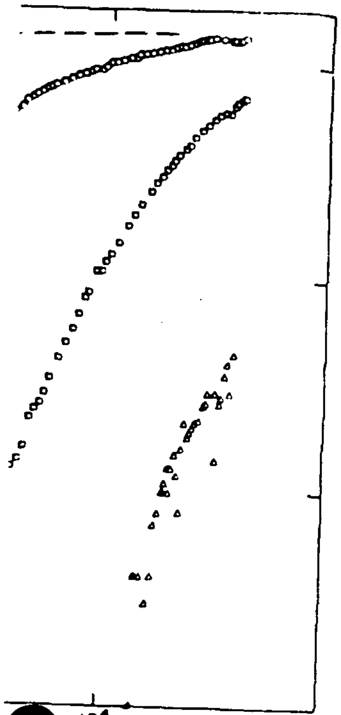

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TABLE 4. Hydraulic Properties of Aquitard Layers

Layer	Section Tested	Specific Storage S_s'		Permeability K'	
		cm^{-1}	ft^{-1}	cm/sec	gpd/ft²
Upper aquitard	bottom 21 feet	7.88×10^{-6}	2.4×10^{-4}	1.11×10^{-6}	2.45×10^{-2}
Upper aquitard	bottom 11 feet	7.88×10^{-6}	2.4×10^{-4}	2.66×10^{-6}	5.85×10^{-2}
Lower aquitard	top 6 feet	3.28×10^{-6}	1.0×10^{-4}	1.89×10^{-6}	4.17×10^{-2}

of 93 feet, one has

$$K = \frac{T}{b} = \frac{130{,}600}{93} = 1405 \text{ gpd/ft}^2$$

and

$$S_s = \frac{S}{b} = \frac{1.12 \times 10^{-4}}{93} = 1.20 \times 10^{-6} \text{ ft}^{-1}$$

Thus the permeability of the aquifer exceeds that of the aquitards by more than 4 orders of magnitude. However, note that the specific storage of the aquifer is less than S_s' in the aquitards above and below by 2 orders of magnitude. In other words, for the same change in head a unit volume of aquitard material can contribute about 100 times more water from storage than a similar volume of the aquifer can. This statistic confirms our belief that storage in the aquitards must be considered when one deals with leaky aquifer systems.

NOTATION

- a_{v_i}, coefficient of compressibility, equal to $-\Delta e/\Delta p$, LT^2M^{-1};
- b_i, thickness of ith aquifer, L;
- b_j', thickness of jth aquitard, L;
- e, void ratio;
- K_i, permeability of ith aquifer, LT^{-1};
- K_j', permeability of jth aquitard, LT^{-1};
- p, pressure, $ML^{-1}T^{-2}$;
- Q_i, pumping rate from ith aquifer, L^3T^{-1};
- r, radial distance from pumping well, L;
- r/B_{ij}, dimensionless leakage parameter, equal to $r(K_j'/K_ib_ib_j')^{1/2}$;
- s_{D_i}, dimensionless drawdown, equal to $4\pi T_is/Q_i$;
- s_i, drawdown in ith aquifer, L;
- s_j', drawdown in jth aquitard, L;
- S_i, storage coefficient of ith aquifer, equal to $S_{s_i}b_i$;
- S_{s_i}, specific storage of ith aquifer, L^{-1};
- S_{s_j}', specific storage of jth aquitard, L^{-1};
- t, pumping time, T;
- t_{D_i}, dimensionless time for pumped ith aquifer, equal to $K_it/S_{s_i}r^2$;
- t_{D_j}', dimensionless time for jth aquitard, equal to $K_j't/S_{s_j}'z^2$;
- T_i, transmissibility of ith aquifer, equal to K_ib_i, L^2T^{-1};
- z, vertical coordinate, L;
- α_i, hydraulic diffusivity of ith aquifer, equal to K_i/S_{s_i}, L^2T^{-1};
- α_j', hydraulic diffusivity of jth aquitard, equal to K_j'/S_{s_j}', L^2T^{-1};
- β_{ij}, dimensionless leakage parameter, equal to $r/4b_i(K_j'S_{s_j}'/K_iS_{s_i})^{1/2}$;
- γ_w, specific weight of water, $ML^{-2}T^{-2}$.

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Appendix 18

REI 10-1 Run #1 Pumping Test Data Sheets

[illegible] LTD REI 10-1 [illegible]
Run 1
09/15/86

SE2000 DATA
constant rate test

TRANSDUCER TABLE

Input 1: REI 10-1
Transducer s/n: 139
Scale factor: 49.5[illegible]
Initial level: 81.7[illegible] feet

FAST DATA

Input 2: GW-25
Transducer s/n: 1857/858
Scale factor: 50.4
Initial level: 82.22 feet

Input 3: NONE
Transducer s/n: NONE
Scale factor: 1

Input 4: REI 3-4
Transducer s/n: 1504/854
Scale factor: 10.02
Initial level: 81.18 feet

Input 5: REI-7
Transducer s/n: 1366/851
Scale factor: 10.03
Initial level: 80.77 feet

Input 6: F-10-2
Transducer s/n: 1634/857
Scale factor: 10.08
Initial level: 46.07 feet

Input 7: F-10-3
Transducer s/n: 1518/854
Scale factor: 10.09
Initial level: 40.09 feet

Input 8: F-10-4
Transducer s/n: 2344/85N
Scale factor: 10.13
Initial level: 38.82 feet

Input 9: REI 10-2
Transducer s/n: 516/830
Scale factor: 10.04
Initial level: 5.66 feet

Input 10: REI 10-3
Transducer s/n: 596/841
Scale factor: 10.03
Initial level: 7.07 feet

Input 11: REI 10-4
Transducer s/n: 1272/84N
Scale factor: 10.05
Initial level: 7.52 feet

Input 12: REI-11
Transducer s/n: 1076/849
Scale factor: 10.07
Initial level: 78.78 feet

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd REI 10-1 Run #1 JOB NO.: 275-14

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ___ DATE: 9-15

CHECKED BY: ___ DATE: ___

Began pumping at 1300 (9-15-86)

FLOW RATE GPM	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
20.0	1300:35	CWA	19.9	17:54	DRG
20.1	13:01	CWA	20.1	17:58	DRG
20.0	13:03	CWA	19.9	18:24	DRG
20.1	1305	BMB	20.3	18:30	DRG
20.0	1310	BMB	20.1	18:31	DRG
20.0	1315	BMB	20.0	19:00	Ari
20.0	1320	BMB	19.9	19:24	DRG
20.0	1330	BMB	19.8	19:34	DRG
19.9	1345	JA	20.0	19:35	DRG
20.0	1400	JA	20.0	19:50	Ari
20.0	1415	BMB	19.8	20:34	DRG
20.0	1430	BMB	20.1	20:35	DRG
20.0	1435	QCM	19.8	21:10	DRG
20.8 *	1447	QCM	19.9	21:38	DRG
20.1	1451	QCM	20.0	21:44	DRG
20.0	1500	JA	19.7	22:17	DRG
20.0	1515	BMB	20.0	22:18	DRG
19.9	1532	JA	19.8	22:28	DRG
20.0	1535	DG	20.1	22:52	DRG
20.3	1546	DG	19.6	23:36	DRG
20.1	1551	DG	19.9	23:38	DRG
19.8	1557	Ari	19.5	00:54	SC
19.9	16:24	Ari	19.7	00:12	SC
19.9	16:40	Ari	19.1	02:07	SC
19.9	17:14	DRG	19.0	300	SC
19.8	17:28	DRG	18.6	335	SC
20.0	17:34	DRG	18.0	400	SC
19.9-20.0	17:41	PCM			

* readjusted immediately to 20 gpm

10-20

30-60

REI

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: French Ltd REI 10-1 Run #1

JOB NO.: ___

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ___ DATE: 6-16

CHECKED BY: ___ DATE: ___

FLOW RATE	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
16.8	440	SC			
16.8	500	SC			
16.8	526	SC			
16.5	557	SC			
16.4	622	SC			
16.1	700	SC			
15.9	721	SC			
15.4	745	SC			
15.0	815	BMB			
14.8	830	BMB			
14.7	845				
14.4	930				
15.2	1030				
Reduced 12	1043				
12.2	1130				
12.2	1230				
12.5	1303				
13	1312				
13	1315				
13.5	1320				
14	1330				

15

REI

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

PROJECT: ______________________ JOB NO.: ______

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ____ DATE: ____

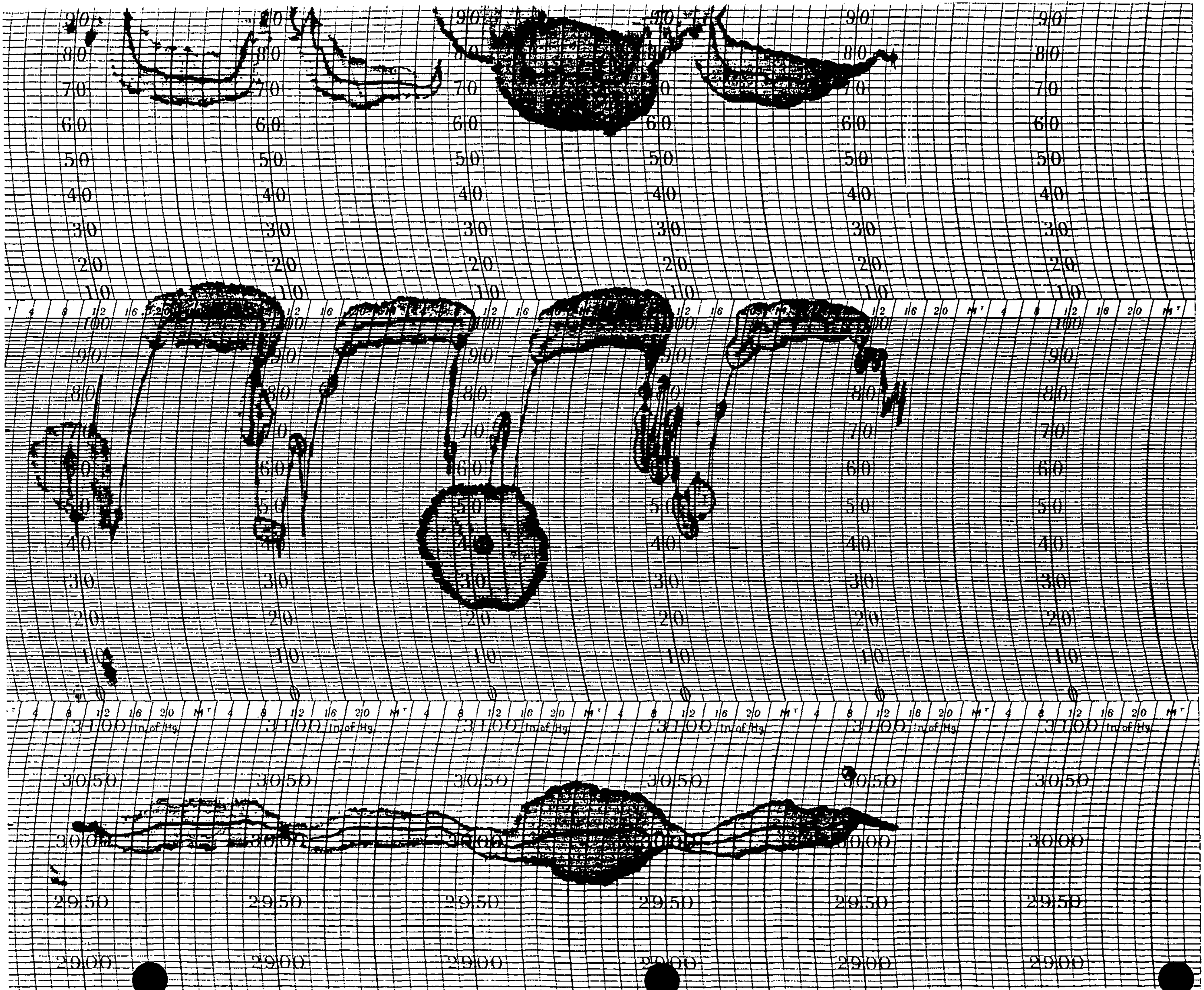
CHECKED BY: ____ DATE: ____

9-16-86

At 1043 reduced flow to 12 gpm, as per P. Mann. Pumping well recovered ≈ 10' and appears to be stable at Δ-40.87 at 1058. Will maintain flow at 12gpm

FLOW RATE	TIME (2400)	MONITORS INITIALS	Notes	FLOW RATE	TIME (2400)	MONITORS INITIALS
14.7	845	BMB		14.5	1430	BMB
14.5	900	BMB		14.5	1445	BMB
14.3	915	BMB		14.5	1500	BMB
14.4	930	BMB		14.7	1515	BMB
14.4	945	BMB		14.6	1539	DRG
14.8	1000	BMB		14.7	1552	D.W.D
14.9	1015	BMB		14.6	16:00	A.T.
15.2	1030	BMB	Δ-51.79'	14.7	16:20	A.T.
15.4	1043	BMB				
12.0	1045	BMB				
12.1	1100	BMB	Δ-40.88'			
12.1	1115	BMB				
12.2	1130	BMB				
12.0	1145	BMB				
12.0	1200	BMB	Δ-35.00			
12.0	1215	BMB	At 1303 increase flow to 12.5gpm as per Dave Dorrance.			
12.2	1230	BMB				
12.0	1245	BMB				
12.0	1300	BMB				
12.5	1303	BMB				
13.0	1312	BMB				
13.0	1315	BMB				
13.5	1320	BMB				
13.5	1330	BMB				
14.0	1330	BMB				
14.0	1345	BMB				
14.0	1400	BMB				
14.5	1415	BMB				

REI



WEATHERMEASURE CORPORATION

STATION

METEORO GRAPH

DATE ON 9-15-86

DATE OFF 9-19-86

C701-
P/N 6

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 10-1 INPUT 1
RADIUS: 0.166 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 81.72 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
13:00	0.000	81.72	0.00	0.00E+00
13:00	0.017	85.92	-4.20	4.28E-04
13:00	0.034	88.15	-6.43	8.57E-04
13:00	0.050	82.53	-0.81	1.26E-03
13:00	0.067	90.27	-8.55	1.69E-03
13:00	0.084	91.43	-9.71	2.12E-03
13:00	0.100	90.74	-9.02	2.52E-03
13:00	0.117	91.03	-9.31	2.95E-03
13:00	0.134	91.10	-9.38	3.38E-03
13:00	0.150	91.04	-9.32	3.78E-03
13:00	0.167	91.54	-9.82	4.21E-03
13:00	0.257	94.20	-12.48	6.48E-03
13:00	0.340	96.32	-14.60	8.57E-03
13:00	0.424	97.98	-16.26	1.07E-02
13:00	0.507	99.19	-17.47	1.28E-02
13:00	0.590	100.42	-18.70	1.49E-02
13:00	0.674	101.48	-19.76	1.70E-02
13:00	0.757	102.35	-20.63	1.91E-02
13:00	0.840	103.12	-21.40	2.12E-02
13:00	0.924	103.98	-22.26	2.33E-02
13:01	1.007	104.86	-23.14	2.54E-02
13:01	1.417	107.93	-26.21	3.57E-02
13:01	1.750	109.30	-27.58	4.41E-02
13:02	2.084	110.53	-28.81	5.25E-02
13:02	2.417	111.40	-29.68	6.09E-02
13:02	2.750	112.00	-30.28	6.93E-02
13:03	3.084	112.48	-30.76	7.77E-02
13:03	3.417	112.90	-31.18	8.61E-02
13:03	3.750	113.39	-31.67	9.45E-02
13:04	4.084	113.73	-32.01	1.03E-01
13:04	4.417	114.09	-32.37	1.11E-01
13:04	4.750	114.31	-32.59	1.20E-01
13:05	5.084	114.44	-32.72	1.28E-01
13:05	5.417	114.69	-32.97	1.37E-01
13:05	5.750	114.78	-33.06	1.45E-01
13:06	6.084	115.08	-33.36	1.53E-01
13:06	6.417	115.13	-33.41	1.62E-01
13:06	6.750	115.41	-33.69	1.70E-01
13:07	7.084	115.58	-33.86	1.79E-01
13:07	7.417	115.61	-33.89	1.87E-01

13:07	7.750	115.63	-33.91	1.95E-01
13:08	8.084	115.71	-33.99	2.04E-01
13:08	8.417	115.71	-33.99	2.12E-01
13:08	8.750	115.75	-34.03	2.21E-01
13:09	9.084	115.92	-34.20	2.29E-01
13:09	9.417	115.98	-34.26	2.37E-01
13:09	9.750	115.96	-34.24	2.46E-01
13:10	10.084	116.12	-34.40	2.54E-01
13:12	12.101	116.45	-34.73	3.05E-01
13:14	14.188	116.77	-35.05	3.58E-01
13:16	16.139	117.02	-35.30	4.07E-01
13:18	18.237	117.31	-35.59	4.60E-01
13:20	20.233	117.60	-35.88	5.10E-01
13:22	22.233	117.69	-35.97	5.60E-01
13:24	24.233	117.99	-36.27	6.11E-01
13:26	26.233	118.18	-36.46	6.61E-01
13:28	28.233	118.41	-36.69	7.12E-01
13:30	30.233	118.68	-36.96	7.62E-01
13:32	32.152	118.72	-37.00	8.10E-01
13:34	34.620	119.01	-37.29	8.72E-01
13:36	36.095	119.08	-37.36	9.10E-01
13:38	38.095	119.11	-37.39	9.60E-01
13:40	40.095	119.37	-37.65	1.01E+00
13:42	42.195	119.42	-37.70	1.06E+00
13:44	44.232	119.48	-37.76	1.11E+00
13:46	46.232	119.64	-37.92	1.17E+00
13:48	48.252	119.74	-38.02	1.22E+00
13:50	50.122	119.90	-38.18	1.26E+00
13:52	52.122	119.97	-38.25	1.31E+00
13:54	54.122	120.00	-38.28	1.36E+00
13:56	56.122	120.17	-38.45	1.41E+00
13:58	58.122	120.28	-38.56	1.46E+00
14:00	60.122	121.10	-39.38	1.52E+00
14:02	62.122	121.43	-39.71	1.57E+00
14:04	64.122	121.64	-39.92	1.62E+00
14:06	66.442	121.94	-40.22	1.67E+00
14:08	68.122	122.21	-40.49	1.72E+00
14:10	70.335	122.44	-40.72	1.77E+00
14:12	72.160	122.76	-41.04	1.82E+00
14:14	74.160	123.51	-41.79	1.87E+00
14:16	76.167	123.81	-42.09	1.92E+00
14:18	78.230	123.92	-42.20	1.97E+00
14:20	80.217	124.46	-42.74	2.02E+00
14:22	82.213	124.84	-43.12	2.07E+00
14:24	84.213	124.97	-43.25	2.12E+00
14:26	86.213	125.10	-43.38	2.17E+00
14:28	88.213	124.52	-42.80	2.22E+00
14:30	90.213	124.22	-42.50	2.27E+00
14:32	92.213	124.20	-42.48	2.32E+00
14:34	94.213	123.83	-42.11	2.37E+00
14:36	96.213	123.72	-42.00	2.42E+00
14:38	98.238	123.59	-41.87	2.48E+00
15:00	120.220	122.04	-40.32	3.03E+00
15:20	140.130	121.51	-39.79	3.53E+00
15:40	160.130	121.96	-40.24	4.04E+00
16:00	180.370	120.64	-38.92	4.55E+00

16:20	200.200	120.73	-39.01	5.05E+00
16:40	220.200	120.77	-39.05	5.55E+00
17:00	240.080	120.87	-39.15	6.05E+00
17:20	260.220	121.24	-39.52	6.56E+00
17:40	280.150	121.43	-39.71	7.06E+00
18:00	300.150	121.73	-40.01	7.56E+00
18:20	320.130	121.67	-39.95	8.07E+00
18:40	340.220	122.23	-40.51	8.57E+00
19:00	360.180	122.20	-40.48	9.08E+00
19:20	380.220	122.34	-40.62	9.58E+00
19:40	400.220	122.66	-40.94	1.01E+01
20:00	420.220	122.73	-41.01	1.06E+01
20:20	440.220	123.00	-41.28	1.11E+01
20:40	460.220	123.59	-41.87	1.16E+01
21:00	480.120	123.79	-42.07	1.21E+01
21:20	500.220	124.24	-42.52	1.26E+01
21:40	520.320	124.41	-42.69	1.31E+01
22:00	540.200	125.62	-43.90	1.36E+01
22:20	560.100	125.90	-44.18	1.41E+01
22:40	580.100	126.64	-44.92	1.46E+01
23:00	600.150	127.25	-45.53	1.51E+01
23:20	620.150	127.60	-45.88	1.56E+01
23:40	640.180	128.32	-46.60	1.61E+01
00:00	660.180	128.61	-46.89	1.66E+01
00:20	680.180	129.38	-47.66	1.71E+01
00:40	700.180	129.26	-47.54	1.76E+01
01:00	720.180	130.71	-48.99	1.81E+01
01:20	740.180	131.74	-50.02	1.87E+01
01:40	760.180	131.52	-49.80	1.92E+01
02:00	780.180	131.31	-49.59	1.97E+01
02:20	800.180	131.48	-49.76	2.02E+01
02:40	820.180	131.91	-50.19	2.07E+01
03:00	840.180	132.15	-50.43	2.12E+01
03:20	860.180	131.92	-50.20	2.17E+01
03:40	880.180	131.36	-49.64	2.22E+01
04:00	900.180	131.49	-49.77	2.27E+01
04:20	920.180	131.64	-49.92	2.32E+01
04:40	940.180	131.75	-50.03	2.37E+01
05:00	960.180	131.98	-50.26	2.42E+01
05:20	980.180	132.07	-50.35	2.47E+01
05:40	1000.200	132.18	-50.46	2.52E+01
06:40	1060.400	132.45	-50.73	2.67E+01
07:40	1120.500	132.67	-50.95	2.82E+01
08:40	1180.300	132.94	-51.22	2.97E+01
09:40	1240.300	133.12	-51.40	3.13E+01
10:40	1300.200	133.44	-51.72	3.28E+01
11:40	1360.300	119.83	-38.11	3.43E+01
12:40	1420.300	115.81	-34.09	3.58E+01
13:40	1480.200	117.78	-36.06	3.73E+01
14:40	1540.300	117.74	-36.02	3.88E+01
15:40	1600.300	118.22	-36.50	4.03E+01
16:30	1650.600	105.33	-23.61	4.16E+01

TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-1 INPUT 1
RADIUS: 0.166 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 81.72 FEET
WATER STOP LEVEL: 105.33 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:30	0.017	103.91	1.42	22.19	4.28E-04	9.71E+04
16:30	0.034	103.70	1.63	21.98	8.57E-04	4.85E+04
16:30	0.050	103.48	1.85	21.76	1.26E-03	3.30E+04
16:30	0.067	103.28	2.05	21.56	1.69E-03	2.46E+04
16:30	0.084	103.07	2.26	21.35	2.12E-03	1.97E+04
16:30	0.100	102.88	2.45	21.16	2.52E-03	1.65E+04
16:30	0.117	102.68	2.65	20.96	2.95E-03	1.41E+04
16:30	0.134	102.48	2.85	20.76	3.38E-03	1.23E+04
16:30	0.150	102.30	3.03	20.58	3.78E-03	1.10E+04
16:30	0.167	102.10	3.23	20.38	4.21E-03	9.88E+03
16:30	0.257	101.11	4.22	19.39	6.48E-03	6.42E+03
16:30	0.340	100.28	5.05	18.56	8.57E-03	4.86E+03
16:30	0.424	99.52	5.81	17.80	1.07E-02	3.89E+03
16:30	0.507	98.82	6.51	17.10	1.28E-02	3.26E+03
16:30	0.591	98.18	7.15	16.46	1.49E-02	2.79E+03
16:30	0.674	97.59	7.74	15.87	1.70E-02	2.45E+03
16:30	0.757	97.03	8.30	15.31	1.91E-02	2.18E+03
16:30	0.840	96.53	8.80	14.81	2.12E-02	1.97E+03
16:30	0.924	96.06	9.27	14.34	2.33E-02	1.79E+03
16:31	1.007	95.62	9.71	13.90	2.54E-02	1.64E+03
16:31	1.417	93.96	11.37	12.24	3.57E-02	1.17E+03
16:31	1.751	93.00	12.33	11.28	4.41E-02	9.44E+02
16:32	2.084	92.32	13.01	10.60	5.25E-02	7.93E+02
16:32	2.417	91.80	13.53	10.08	6.09E-02	6.84E+02
16:32	2.751	91.43	13.90	9.71	6.93E-02	6.01E+02
16:33	3.084	91.13	14.20	9.41	7.77E-02	5.36E+02
16:33	3.417	90.91	14.42	9.19	8.61E-02	4.84E+02
16:33	3.751	90.74	14.59	9.02	9.45E-02	4.41E+02
16:34	4.084	90.60	14.73	8.88	1.03E-01	4.05E+02
16:34	4.417	90.50	14.83	8.78	1.11E-01	3.75E+02
16:34	4.751	90.40	14.93	8.68	1.20E-01	3.48E+02
16:35	5.084	90.31	15.02	8.59	1.28E-01	3.26E+02
16:35	5.417	90.26	15.07	8.54	1.37E-01	3.06E+02
16:35	5.751	90.18	15.15	8.46	1.45E-01	2.88E+02
16:36	6.084	90.14	15.19	8.42	1.53E-01	2.72E+02
16:36	6.417	90.10	15.23	8.38	1.62E-01	2.58E+02
16:36	6.751	90.06	15.27	8.34	1.70E-01	2.45E+02
16:37	7.084	90.01	15.32	8.29	1.79E-01	2.34E+02
16:37	7.417	89.97	15.36	8.25	1.87E-01	2.24E+02
16:37	7.751	89.94	15.39	8.22	1.95E-01	2.14E+02
16:38	8.084	89.90	15.43	8.18	2.04E-01	2.05E+02
16:38	8.417	89.87	15.46	8.15	2.12E-01	1.97E+02

16:38	8.751	89.84	15.49	8.12	2.21E-01	1.90E+02
16:39	9.084	89.81	15.52	8.09	2.29E-01	1.83E+02
16:39	9.417	89.78	15.55	8.06	2.37E-01	1.76E+02
16:39	9.751	89.76	15.57	8.04	2.46E-01	1.70E+02
16:40	10.084	89.73	15.60	8.01	2.54E-01	1.65E+02
16:42	12.120	89.60	15.73	7.88	3.05E-01	1.37E+02
16:44	14.120	89.48	15.85	7.76	3.56E-01	1.18E+02
16:46	16.120	89.38	15.95	7.66	4.06E-01	1.03E+02
16:48	18.120	89.30	16.03	7.58	4.57E-01	9.21E+01
16:50	20.142	89.23	16.10	7.51	5.08E-01	8.29E+01
16:52	22.225	89.17	16.16	7.45	5.60E-01	7.53E+01
16:54	24.225	89.10	16.23	7.38	6.10E-01	6.91E+01
16:56	26.225	89.04	16.29	7.32	6.61E-01	6.39E+01
16:58	28.225	88.98	16.35	7.26	7.11E-01	5.95E+01
17:00	30.225	88.94	16.39	7.22	7.62E-01	5.56E+01
17:02	32.225	88.90	16.43	7.18	8.12E-01	5.22E+01
17:04	34.225	88.86	16.47	7.14	8.63E-01	4.92E+01
17:06	36.225	88.80	16.53	7.08	9.13E-01	4.66E+01
17:08	38.225	88.77	16.56	7.05	9.63E-01	4.42E+01
17:10	40.225	88.73	16.60	7.01	1.01E+00	4.20E+01
17:12	42.225	88.70	16.63	6.98	1.06E+00	4.01E+01
17:14	44.225	88.65	16.68	6.93	1.11E+00	3.83E+01
17:16	46.225	88.63	16.70	6.91	1.16E+00	3.67E+01
17:18	48.225	88.60	16.73	6.88	1.22E+00	3.52E+01
17:20	50.342	88.55	16.78	6.83	1.27E+00	3.38E+01
17:22	52.220	88.53	16.80	6.81	1.32E+00	3.26E+01
17:24	54.222	88.50	16.83	6.78	1.37E+00	3.14E+01
17:26	56.222	88.48	16.85	6.76	1.42E+00	3.04E+01
17:28	58.220	88.44	16.89	6.72	1.47E+00	2.94E+01
17:30	60.120	88.43	16.90	6.71	1.52E+00	2.85E+01
17:32	62.220	88.38	16.95	6.66	1.57E+00	2.75E+01
17:34	64.222	88.37	16.96	6.65	1.62E+00	2.67E+01
17:36	66.220	88.34	16.99	6.62	1.67E+00	2.59E+01
17:38	68.220	88.31	17.02	6.59	1.72E+00	2.52E+01
17:40	70.220	88.28	17.05	6.56	1.77E+00	2.45E+01
17:42	72.220	88.25	17.08	6.53	1.82E+00	2.39E+01
17:44	74.222	88.24	17.09	6.52	1.87E+00	2.32E+01
17:46	76.095	88.21	17.12	6.49	1.92E+00	2.27E+01
17:48	78.180	88.20	17.13	6.48	1.97E+00	2.21E+01
17:50	80.575	88.17	17.16	6.45	2.03E+00	2.15E+01
17:52	82.215	88.15	17.18	6.43	2.07E+00	2.11E+01
17:54	84.215	88.13	17.20	6.41	2.12E+00	2.06E+01
17:56	86.215	88.11	17.22	6.39	2.17E+00	2.01E+01
17:58	88.215	88.08	17.25	6.36	2.22E+00	1.97E+01
18:00	90.493	88.07	17.26	6.35	2.28E+00	1.92E+01
18:02	92.210	88.04	17.29	6.32	2.32E+00	1.89E+01
18:04	94.248	88.03	17.30	6.31	2.38E+00	1.85E+01
18:06	96.248	88.01	17.32	6.29	2.43E+00	1.81E+01
18:08	98.248	87.98	17.35	6.26	2.48E+00	1.78E+01
18:30	120.250	87.78	17.55	6.06	3.03E+00	1.47E+01
18:50	140.250	87.63	17.70	5.91	3.53E+00	1.28E+01
19:10	160.180	87.48	17.85	5.76	4.04E+00	1.13E+01
19:30	180.170	87.34	17.99	5.62	4.54E+00	1.02E+01
19:50	200.220	87.22	18.11	5.50	5.05E+00	9.24E+00
20:10	220.150	87.11	18.22	5.39	5.55E+00	8.50E+00
20:30	240.150	87.00	18.33	5.28	6.05E+00	7.87E+00

20:50	260.150	86.90	18.43	5.18	6.56E+00	7.34E+00
21:10	280.250	86.80	18.53	5.08	7.06E+00	6.89E+00
21:30	300.250	86.71	18.62	4.99	7.57E+00	6.50E+00
21:50	320.250	86.62	18.71	4.90	8.07E+00	6.15E+00
22:10	340.250	86.54	18.79	4.82	8.57E+00	5.85E+00
22:30	360.220	86.47	18.86	4.75	9.08E+00	5.58E+00
22:50	380.080	86.40	18.93	4.68	9.58E+00	5.34E+00
23:10	400.080	86.32	19.01	4.60	1.01E+01	5.13E+00
23:30	420.150	86.25	19.08	4.53	1.06E+01	4.93E+00
23:50	440.080	86.20	19.13	4.48	1.11E+01	4.75E+00
00:10	460.220	86.12	19.21	4.40	1.16E+01	4.59E+00
00:30	480.220	86.07	19.26	4.35	1.21E+01	4.44E+00
00:50	500.220	86.02	19.31	4.30	1.26E+01	4.30E+00
01:10	520.220	85.95	19.38	4.23	1.31E+01	4.17E+00
01:30	540.220	85.91	19.42	4.19	1.36E+01	4.06E+00
01:50	560.220	85.85	19.48	4.13	1.41E+01	3.95E+00
02:10	580.220	85.79	19.54	4.07	1.46E+01	3.84E+00
02:30	600.220	85.75	19.58	4.03	1.51E+01	3.75E+00
02:50	620.220	85.71	19.62	3.99	1.56E+01	3.66E+00
03:10	640.220	85.65	19.68	3.93	1.61E+01	3.58E+00
03:30	660.220	85.62	19.71	3.90	1.66E+01	3.50E+00
03:50	680.220	85.57	19.76	3.85	1.71E+01	3.43E+00
04:10	700.220	85.52	19.81	3.80	1.76E+01	3.36E+00
04:30	720.220	85.48	19.85	3.76	1.82E+01	3.29E+00
04:50	740.220	85.45	19.88	3.73	1.87E+01	3.23E+00
05:10	760.220	85.41	19.92	3.69	1.92E+01	3.17E+00
05:30	780.220	85.37	19.96	3.65	1.97E+01	3.12E+00
05:50	800.220	85.32	20.01	3.60	2.02E+01	3.06E+00
06:10	820.220	85.29	20.04	3.57	2.07E+01	3.01E+00
06:30	840.220	85.25	20.08	3.53	2.12E+01	2.96E+00
06:50	860.220	85.22	20.11	3.50	2.17E+01	2.92E+00
07:10	880.180	85.18	20.15	3.46	2.22E+01	2.88E+00
07:30	900.180	85.15	20.18	3.43	2.27E+01	2.83E+00
07:50	920.180	85.12	20.21	3.40	2.32E+01	2.79E+00
08:10	940.180	85.08	20.25	3.36	2.37E+01	2.76E+00
08:30	960.180	85.05	20.28	3.33	2.42E+01	2.72E+00
08:50	980.170	85.02	20.31	3.30	2.47E+01	2.68E+00
09:10	1000.200	84.99	20.34	3.27	2.52E+01	2.65E+00
10:10	1060.400	84.92	20.41	3.20	2.67E+01	2.56E+00
11:10	1120.700	84.85	20.48	3.13	2.82E+01	2.47E+00
12:10	1180.300	84.77	20.56	3.05	2.97E+01	2.40E+00
13:10	1240.300	84.69	20.64	2.97	3.13E+01	2.33E+00
14:10	1300.400	84.64	20.69	2.92	3.28E+01	2.27E+00
15:10	1360.300	84.59	20.74	2.87	3.43E+01	2.21E+00
16:10	1420.200	84.52	20.81	2.80	3.58E+01	2.16E+00
17:10	1480.300	84.45	20.88	2.73	3.73E+01	2.12E+00
18:10	1540.300	84.38	20.95	2.66	3.88E+01	2.07E+00
19:10	1600.300	84.31	21.02	2.59	4.03E+01	2.03E+00
20:10	1660.300	84.27	21.06	2.55	4.18E+01	1.99E+00
21:10	1720.300	84.21	21.12	2.49	4.34E+01	1.96E+00
22:10	1780.300	84.17	21.16	2.45	4.49E+01	1.93E+00
23:10	1840.300	84.11	21.22	2.39	4.64E+01	1.90E+00
00:10	1900.300	84.06	21.27	2.34	4.79E+01	1.87E+00
01:10	1960.300	84.01	21.32	2.29	4.94E+01	1.84E+00
02:10	2020.300	83.98	21.35	2.26	5.09E+01	1.82E+00
03:10	2080.300	83.92	21.41	2.20	5.24E+01	1.79E+00

04:10	2140.300	83.88	21.45	2.16	5.39E+01	1.77E+00
05:10	2200.300	83.84	21.49	2.12	5.55E+01	1.75E+00
06:10	2260.300	83.79	21.54	2.07	5.70E+01	1.73E+00
07:10	2320.300	83.75	21.58	2.03	5.85E+01	1.71E+00
08:10	2380.300	83.71	21.62	1.99	6.00E+01	1.69E+00
09:10	2440.300	83.68	21.65	1.96	6.15E+01	1.68E+00
10:10	2500.300	83.65	21.68	1.93	6.30E+01	1.66E+00
11:10	2560.300	83.62	21.71	1.90	6.45E+01	1.64E+00
12:10	2620.400	83.59	21.74	1.87	6.60E+01	1.63E+00
13:10	2680.400	83.56	21.77	1.84	6.75E+01	1.62E+00
14:10	2740.400	83.52	21.81	1.80	6.91E+01	1.60E+00
15:10	2800.400	83.52	21.81	1.80	7.06E+01	1.59E+00
16:10	2860.400	83.49	21.84	1.77	7.21E+01	1.58E+00
17:10	2920.400	83.45	21.88	1.73	7.36E+01	1.57E+00
18:10	2980.400	83.44	21.89	1.72	7.51E+01	1.55E+00
19:10	3040.200	83.38	21.95	1.66	7.66E+01	1.54E+00
20:10	3100.200	83.35	21.98	1.63	7.81E+01	1.53E+00
21:10	3160.200	83.32	22.01	1.60	7.96E+01	1.52E+00
22:10	3220.200	83.31	22.02	1.59	8.12E+01	1.51E+00
23:10	3280.200	83.28	22.05	1.56	8.27E+01	1.50E+00
00:10	3340.200	83.29	22.04	1.57	8.42E+01	1.49E+00
01:10	3400.200	83.24	22.09	1.52	8.57E+01	1.49E+00
02:10	3460.200	83.24	22.09	1.52	8.72E+01	1.48E+00
03:10	3520.200	83.19	22.14	1.47	8.87E+01	1.47E+00
04:10	3580.300	83.16	22.17	1.44	9.02E+01	1.46E+00
05:10	3640.300	83.21	22.12	1.49	9.17E+01	1.45E+00
06:10	3700.300	83.14	22.19	1.42	9.33E+01	1.45E+00
07:10	3760.300	83.08	22.25	1.36	9.48E+01	1.44E+00
07:36	3786.600	83.06	22.27	1.34	9.54E+01	1.44E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: GW-25 INPUT 2
RADIUS: 66.670 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 82.22 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
13:00	0.000	82.22	0.00	0.00E+00
13:00	0.017	-999.99	1082.21	2.66E-09
13:00	0.034	-999.99	1082.21	5.31E-09
13:00	0.050	-999.99	1082.21	7.81E-09
13:00	0.067	-999.99	1082.21	1.05E-08
13:00	0.084	-999.99	1082.21	1.31E-08
13:00	0.100	-999.99	1082.21	1.56E-08
13:00	0.117	-999.99	1082.21	1.83E-08
13:00	0.134	-999.99	1082.21	2.09E-08
13:00	0.150	-999.99	1082.21	2.34E-08
13:00	0.167	-999.99	1082.21	2.61E-08
13:00	0.257	82.22	0.00	4.02E-08
13:00	0.340	82.22	0.00	5.31E-08
13:00	0.424	82.24	-0.02	6.62E-08
13:00	0.507	82.24	-0.02	7.92E-08
13:00	0.590	82.25	-0.03	9.22E-08
13:00	0.674	82.26	-0.04	1.05E-07
13:00	0.757	82.28	-0.06	1.18E-07
13:00	0.840	82.29	-0.07	1.31E-07
13:00	0.924	82.31	-0.09	1.44E-07
13:01	1.007	82.32	-0.10	1.57E-07
13:01	1.417	82.44	-0.22	2.21E-07
13:01	1.750	82.54	-0.32	2.73E-07
13:02	2.084	82.66	-0.44	3.26E-07
13:02	2.417	82.76	-0.54	3.78E-07
13:02	2.750	82.87	-0.65	4.30E-07
13:03	3.084	82.96	-0.74	4.82E-07
13:03	3.417	83.06	-0.84	5.34E-07
13:03	3.750	83.18	-0.96	5.86E-07
13:04	4.084	83.27	-1.05	6.38E-07
13:04	4.417	83.35	-1.13	6.90E-07
13:04	4.750	83.44	-1.22	7.42E-07
13:05	5.084	83.51	-1.29	7.94E-07
13:05	5.417	83.59	-1.37	8.46E-07
13:05	5.750	83.66	-1.44	8.98E-07
13:06	6.084	83.73	-1.51	9.51E-07
13:06	6.417	83.79	-1.57	1.00E-06
13:06	6.750	83.85	-1.63	1.05E-06
13:07	7.084	83.91	-1.69	1.11E-06
13:07	7.417	83.96	-1.74	1.16E-06

13:07	7.750	84.02	-1.80	1.21E-06
13:08	8.084	84.07	-1.85	1.26E-06
13:08	8.417	84.11	-1.89	1.32E-06
13:08	8.750	84.17	-1.95	1.37E-06
13:09	9.084	84.21	-1.99	1.42E-06
13:09	9.417	84.26	-2.04	1.47E-06
13:09	9.750	84.24	-2.02	1.52E-06
13:10	10.084	84.34	-2.12	1.58E-06
13:12	12.101	84.52	-2.30	1.89E-06
13:14	14.188	84.71	-2.49	2.22E-06
13:16	16.139	84.82	-2.60	2.52E-06
13:18	18.237	84.95	-2.73	2.85E-06
13:20	20.233	85.07	-2.85	3.16E-06
13:22	22.233	85.16	-2.94	3.47E-06
13:24	24.233	85.26	-3.04	3.79E-06
13:26	26.233	85.34	-3.12	4.10E-06
13:28	28.233	85.42	-3.20	4.41E-06
13:30	30.233	85.49	-3.27	4.72E-06
13:32	32.152	85.56	-3.34	5.02E-06
13:34	34.620	85.65	-3.43	5.41E-06
13:36	36.095	85.69	-3.47	5.64E-06
13:38	38.095	85.75	-3.53	5.95E-06
13:40	40.095	85.81	-3.59	6.26E-06
13:42	42.195	85.85	-3.63	6.59E-06
13:44	44.232	85.91	-3.69	6.91E-06
13:46	46.232	85.97	-3.75	7.22E-06
13:48	48.252	86.03	-3.81	7.54E-06
13:50	50.122	86.06	-3.84	7.83E-06
13:52	52.122	86.12	-3.90	8.14E-06
13:54	54.122	86.16	-3.94	8.46E-06
13:56	56.122	86.20	-3.98	8.77E-06
13:58	58.122	86.25	-4.03	9.08E-06
14:00	60.122	86.28	-4.06	9.39E-06
14:02	62.122	86.33	-4.11	9.71E-06
14:04	64.122	86.39	-4.17	1.00E-05
14:06	66.442	86.45	-4.23	1.04E-05
14:08	68.122	86.51	-4.29	1.06E-05
14:10	70.335	86.57	-4.35	1.10E-05
14:12	72.160	86.59	-4.37	1.13E-05
14:14	74.160	86.64	-4.42	1.16E-05
14:16	76.167	86.71	-4.49	1.19E-05
14:18	78.230	86.75	-4.53	1.22E-05
14:20	80.217	86.81	-4.59	1.25E-05
14:22	82.213	86.86	-4.64	1.28E-05
14:24	84.213	86.91	-4.69	1.32E-05
14:26	86.213	86.96	-4.74	1.35E-05
14:28	88.213	87.00	-4.78	1.38E-05
14:30	90.213	87.02	-4.80	1.41E-05
14:32	92.213	87.05	-4.83	1.44E-05
14:34	94.213	87.06	-4.84	1.47E-05
14:36	96.213	87.07	-4.85	1.50E-05
14:38	98.238	87.09	-4.87	1.53E-05
15:00	120.220	87.23	-5.01	1.88E-05
15:20	140.130	87.35	-5.13	2.19E-05
15:40	160.130	87.54	-5.32	2.50E-05
16:00	180.370	87.68	-5.46	2.82E-05

16:20	200.200	87.77	-5.55	3.13E-05
16:40	220.200	87.90	-5.68	3.44E-05
17:00	240.080	88.02	-5.80	3.75E-05
17:20	260.220	88.16	-5.94	4.07E-05
17:40	280.150	88.29	-6.07	4.38E-05
18:00	300.150	88.41	-6.19	4.69E-05
18:20	320.130	88.54	-6.32	5.00E-05
18:40	340.220	88.67	-6.45	5.32E-05
19:00	360.180	88.79	-6.57	5.63E-05
19:20	380.220	88.89	-6.67	5.94E-05
19:40	400.220	89.01	-6.79	6.25E-05
20:00	420.220	89.11	-6.89	6.57E-05
20:20	440.220	89.21	-6.99	6.88E-05
20:40	460.220	89.33	-7.11	7.19E-05
21:00	480.120	89.43	-7.21	7.50E-05
21:20	500.220	89.54	-7.32	7.82E-05
21:40	520.320	89.66	-7.44	8.13E-05
22:00	540.200	89.78	-7.56	8.44E-05
22:20	560.100	89.91	-7.69	8.75E-05
22:40	580.100	90.05	-7.83	9.06E-05
23:00	600.150	90.21	-7.99	9.38E-05
23:20	620.150	90.34	-8.12	9.69E-05
23:40	640.180	90.47	-8.25	1.00E-04
00:00	660.180	90.62	-8.40	1.03E-04
00:20	680.180	90.77	-8.55	1.06E-04
00:40	700.180	90.87	-8.65	1.09E-04
01:00	720.180	91.00	-8.78	1.13E-04
01:20	740.180	91.19	-8.97	1.16E-04
01:40	760.180	91.32	-9.10	1.19E-04
02:00	780.180	91.38	-9.16	1.22E-04
02:20	800.180	91.46	-9.24	1.25E-04
02:40	820.180	91.56	-9.34	1.28E-04
03:00	840.180	91.65	-9.43	1.31E-04
03:20	860.180	91.75	-9.53	1.34E-04
03:40	880.180	91.78	-9.56	1.38E-04
04:00	900.180	91.83	-9.61	1.41E-04
04:20	920.180	91.90	-9.68	1.44E-04
04:40	940.180	91.96	-9.74	1.47E-04
05:00	960.180	92.03	-9.81	1.50E-04
05:20	980.180	92.10	-9.88	1.53E-04
05:40	1000.200	92.18	-9.96	1.56E-04
06:40	1060.400	92.35	-10.13	1.66E-04
07:40	1120.500	92.54	-10.32	1.75E-04
08:40	1180.300	92.71	-10.49	1.84E-04
09:40	1240.300	92.87	-10.65	1.94E-04
10:40	1300.200	93.03	-10.81	2.03E-04
11:40	1360.300	92.09	-9.87	2.13E-04
12:40	1420.300	91.59	-9.37	2.22E-04
13:40	1480.200	91.54	-9.32	2.31E-04
14:40	1540.300	91.48	-9.26	2.41E-04
15:40	1600.300	91.51	-9.29	2.50E-04
16:30	1650.600	91.52	-9.30	2.58E-04

TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: GW-25 INPUT 2
RADIUS: 66.670 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 82.22 FEET
WATER STOP LEVEL: 91.52 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:30	0.017	-999.99	1091.51	1082.21	2.66E-09	9.71E+04
16:30	0.034	-999.99	1091.51	1082.21	5.31E-09	4.85E+04
16:30	0.050	-999.99	1091.51	1082.21	7.81E-09	3.30E+04
16:30	0.067	-999.99	1091.51	1082.21	1.05E-08	2.46E+04
16:30	0.084	-999.99	1091.51	1082.21	1.31E-08	1.97E+04
16:30	0.100	-999.99	1091.51	1082.21	1.56E-08	1.65E+04
16:30	0.117	-999.99	1091.51	1082.21	1.83E-08	1.41E+04
16:30	0.134	-999.99	1091.51	1082.21	2.09E-08	1.23E+04
16:30	0.150	-999.99	1091.51	1082.21	2.34E-08	1.10E+04
16:30	0.167	-999.99	1091.51	1082.21	2.61E-08	9.88E+03
16:30	0.257	91.49	0.03	9.27	4.02E-08	6.42E+03
16:30	0.340	91.49	0.03	9.27	5.31E-08	4.86E+03
16:30	0.424	91.49	0.03	9.27	6.62E-08	3.89E+03
16:30	0.507	91.48	0.04	9.26	7.92E-08	3.26E+03
16:30	0.591	91.46	0.06	9.24	9.23E-08	2.79E+03
16:30	0.674	91.46	0.06	9.24	1.05E-07	2.45E+03
16:30	0.757	91.45	0.07	9.23	1.18E-07	2.18E+03
16:30	0.840	91.43	0.09	9.21	1.31E-07	1.97E+03
16:30	0.924	91.42	0.10	9.20	1.44E-07	1.79E+03
16:31	1.007	91.42	0.10	9.20	1.57E-07	1.64E+03
16:31	1.417	91.35	0.17	9.13	2.21E-07	1.17E+03
16:31	1.751	91.27	0.25	9.05	2.74E-07	9.44E+02
16:32	2.084	91.20	0.32	8.98	3.26E-07	7.93E+02
16:32	2.417	91.14	0.38	8.92	3.78E-07	6.84E+02
16:32	2.751	91.07	0.45	8.85	4.30E-07	6.01E+02
16:33	3.084	91.00	0.52	8.78	4.82E-07	5.36E+02
16:33	3.417	90.94	0.58	8.72	5.34E-07	4.84E+02
16:33	3.751	90.87	0.65	8.65	5.86E-07	4.41E+02
16:34	4.084	90.81	0.71	8.59	6.38E-07	4.05E+02
16:34	4.417	90.75	0.77	8.53	6.90E-07	3.75E+02
16:34	4.751	90.71	0.81	8.49	7.42E-07	3.48E+02
16:35	5.084	90.65	0.87	8.43	7.94E-07	3.26E+02
16:35	5.417	90.61	0.91	8.39	8.46E-07	3.06E+02
16:35	5.751	90.56	0.96	8.34	8.99E-07	2.88E+02
16:36	6.084	90.52	1.00	8.30	9.51E-07	2.72E+02
16:36	6.417	90.49	1.03	8.27	1.00E-06	2.58E+02
16:36	6.751	90.45	1.07	8.23	1.05E-06	2.45E+02
16:37	7.084	90.42	1.10	8.20	1.11E-06	2.34E+02
16:37	7.417	90.37	1.15	8.15	1.16E-06	2.24E+02
16:37	7.751	90.34	1.18	8.12	1.21E-06	2.14E+02
16:38	8.084	90.30	1.22	8.08	1.26E-06	2.05E+02
16:38	8.417	90.27	1.25	8.05	1.32E-06	1.97E+02

16:38	8.751	90.24	1.28	8.02	1.37E-06	1.90E+02
16:39	9.084	90.21	1.31	7.99	1.42E-06	1.83E+02
16:39	9.417	90.20	1.32	7.98	1.47E-06	1.76E+02
16:39	9.751	90.17	1.35	7.95	1.52E-06	1.70E+02
16:40	10.084	90.14	1.38	7.92	1.58E-06	1.65E+02
16:42	12.120	90.01	1.51	7.79	1.89E-06	1.37E+02
16:44	14.120	89.89	1.63	7.67	2.21E-06	1.18E+02
16:46	16.120	89.79	1.73	7.57	2.52E-06	1.03E+02
16:48	18.120	89.72	1.80	7.50	2.83E-06	9.21E+01
16:50	20.142	89.65	1.87	7.43	3.15E-06	8.29E+01
16:52	22.225	89.57	1.95	7.35	3.47E-06	7.53E+01
16:54	24.225	89.52	2.00	7.30	3.78E-06	6.91E+01
16:56	26.225	89.46	2.06	7.24	4.10E-06	6.39E+01
16:58	28.225	89.40	2.12	7.18	4.41E-06	5.95E+01
17:00	30.225	89.36	2.16	7.14	4.72E-06	5.56E+01
17:02	32.225	89.31	2.21	7.09	5.03E-06	5.22E+01
17:04	34.225	89.27	2.25	7.05	5.35E-06	4.92E+01
17:06	36.225	89.23	2.29	7.01	5.66E-06	4.66E+01
17:08	38.225	89.18	2.34	6.96	5.97E-06	4.42E+01
17:10	40.225	89.14	2.38	6.92	6.28E-06	4.20E+01
17:12	42.225	89.11	2.41	6.89	6.60E-06	4.01E+01
17:14	44.225	89.08	2.44	6.86	6.91E-06	3.83E+01
17:16	46.225	89.04	2.48	6.82	7.22E-06	3.67E+01
17:18	48.225	89.01	2.51	6.79	7.53E-06	3.52E+01
17:20	50.342	88.98	2.54	6.76	7.87E-06	3.38E+01
17:22	52.220	88.95	2.57	6.73	8.16E-06	3.26E+01
17:24	54.222	88.92	2.60	6.70	8.47E-06	3.14E+01
17:26	56.222	88.89	2.63	6.67	8.78E-06	3.04E+01
17:28	58.220	88.86	2.66	6.64	9.10E-06	2.94E+01
17:30	60.120	88.83	2.69	6.61	9.39E-06	2.85E+01
17:32	62.220	88.80	2.72	6.58	9.72E-06	2.75E+01
17:34	64.222	88.77	2.75	6.55	1.00E-05	2.67E+01
17:36	66.220	88.76	2.76	6.54	1.03E-05	2.59E+01
17:38	68.220	88.73	2.79	6.51	1.07E-05	2.52E+01
17:40	70.220	88.70	2.82	6.48	1.10E-05	2.45E+01
17:42	72.220	88.69	2.83	6.47	1.13E-05	2.39E+01
17:44	74.222	88.66	2.86	6.44	1.16E-05	2.32E+01
17:46	76.095	88.64	2.88	6.42	1.19E-05	2.27E+01
17:48	78.180	88.61	2.91	6.39	1.22E-05	2.21E+01
17:50	80.575	88.59	2.93	6.37	1.26E-05	2.15E+01
17:52	82.215	88.57	2.95	6.35	1.28E-05	2.11E+01
17:54	84.215	88.56	2.96	6.34	1.32E-05	2.06E+01
17:56	86.215	88.53	2.99	6.31	1.35E-05	2.01E+01
17:58	88.215	88.51	3.01	6.29	1.38E-05	1.97E+01
18:00	90.493	88.48	3.04	6.26	1.41E-05	1.92E+01
18:02	92.210	88.47	3.05	6.25	1.44E-05	1.89E+01
18:04	94.248	88.45	3.07	6.23	1.47E-05	1.85E+01
18:06	96.248	88.43	3.09	6.21	1.50E-05	1.81E+01
18:08	98.248	88.41	3.11	6.19	1.53E-05	1.78E+01
18:30	120.250	88.21	3.31	5.99	1.88E-05	1.47E+01
18:50	140.250	88.05	3.47	5.83	2.19E-05	1.28E+01
19:10	160.180	87.90	3.62	5.68	2.50E-05	1.13E+01
19:30	180.170	87.77	3.75	5.55	2.81E-05	1.02E+01
19:50	200.220	87.64	3.88	5.42	3.13E-05	9.24E+00
20:10	220.150	87.52	4.00	5.30	3.44E-05	8.50E+00
20:30	240.150	87.42	4.10	5.20	3.75E-05	7.87E+00

20:50	260.150	87.32	4.20	5.10	4.06E-05	7.34E+00
21:10	280.250	87.22	4.30	5.00	4.38E-05	6.89E+00
21:30	300.250	87.13	4.39	4.91	4.69E-05	6.50E+00
21:50	320.250	87.05	4.47	4.83	5.00E-05	6.15E+00
22:10	340.250	86.97	4.55	4.75	5.32E-05	5.85E+00
22:30	360.220	86.90	4.62	4.68	5.63E-05	5.58E+00
22:50	380.080	86.83	4.69	4.61	5.94E-05	5.34E+00
23:10	400.080	86.75	4.77	4.53	6.25E-05	5.13E+00
23:30	420.150	86.68	4.84	4.46	6.56E-05	4.93E+00
23:50	440.080	86.62	4.90	4.40	6.88E-05	4.75E+00
00:10	460.220	86.57	4.95	4.35	7.19E-05	4.59E+00
00:30	480.220	86.49	5.03	4.27	7.50E-05	4.44E+00
00:50	500.220	86.43	5.09	4.21	7.82E-05	4.30E+00
01:10	520.220	86.38	5.14	4.16	8.13E-05	4.17E+00
01:30	540.220	86.33	5.19	4.11	8.44E-05	4.06E+00
01:50	560.220	86.28	5.24	4.06	8.75E-05	3.95E+00
02:10	580.220	86.23	5.29	4.01	9.07E-05	3.84E+00
02:30	600.220	86.19	5.33	3.97	9.38E-05	3.75E+00
02:50	620.220	86.13	5.39	3.91	9.69E-05	3.66E+00
03:10	640.220	86.09	5.43	3.87	1.00E-04	3.58E+00
03:30	660.220	86.04	5.48	3.82	1.03E-04	3.50E+00
03:50	680.220	86.00	5.52	3.78	1.06E-04	3.43E+00
04:10	700.220	85.96	5.56	3.74	1.09E-04	3.36E+00
04:30	720.220	85.91	5.61	3.69	1.13E-04	3.29E+00
04:50	740.220	85.87	5.65	3.65	1.16E-04	3.23E+00
05:10	760.220	85.84	5.68	3.62	1.19E-04	3.17E+00
05:30	780.220	85.80	5.72	3.58	1.22E-04	3.12E+00
05:50	800.220	85.75	5.77	3.53	1.25E-04	3.06E+00
06:10	820.220	85.72	5.80	3.50	1.28E-04	3.01E+00
06:30	840.220	85.69	5.83	3.47	1.31E-04	2.96E+00
06:50	860.220	85.65	5.87	3.43	1.34E-04	2.92E+00
07:10	880.180	85.62	5.90	3.40	1.38E-04	2.88E+00
07:30	900.180	85.58	5.94	3.36	1.41E-04	2.83E+00
07:50	920.180	85.55	5.97	3.33	1.44E-04	2.79E+00
08:10	940.180	85.52	6.00	3.30	1.47E-04	2.76E+00
08:30	960.180	85.49	6.03	3.27	1.50E-04	2.72E+00
08:50	980.170	85.46	6.06	3.24	1.53E-04	2.68E+00
09:10	1000.200	85.43	6.09	3.21	1.56E-04	2.65E+00
10:10	1060.400	85.36	6.16	3.14	1.66E-04	2.56E+00
11:10	1120.700	85.29	6.23	3.07	1.75E-04	2.47E+00
12:10	1180.300	85.20	6.32	2.98	1.84E-04	2.40E+00
13:10	1240.300	85.13	6.39	2.91	1.94E-04	2.33E+00
14:10	1300.400	85.07	6.45	2.85	2.03E-04	2.27E+00
15:10	1360.300	85.01	6.51	2.79	2.13E-04	2.21E+00
16:10	1420.200	84.95	6.57	2.73	2.22E-04	2.16E+00
17:10	1480.300	84.89	6.63	2.67	2.31E-04	2.12E+00
18:10	1540.300	84.82	6.70	2.60	2.41E-04	2.07E+00
19:10	1600.300	84.76	6.76	2.54	2.50E-04	2.03E+00
20:10	1660.300	84.71	6.81	2.49	2.59E-04	1.99E+00
21:10	1720.300	84.65	6.87	2.43	2.69E-04	1.96E+00
22:10	1780.300	84.59	6.93	2.37	2.78E-04	1.93E+00
23:10	1840.300	84.55	6.97	2.33	2.88E-04	1.90E+00
00:10	1900.300	84.49	7.03	2.27	2.97E-04	1.87E+00
01:10	1960.300	84.46	7.06	2.24	3.06E-04	1.84E+00
02:10	2020.300	84.40	7.12	2.18	3.16E-04	1.82E+00
03:10	2080.300	84.36	7.16	2.14	3.25E-04	1.79E+00

04:10	2140.300	84.31	7.21	2.09	3.34E-04	1.77E+00
05:10	2200.300	84.27	7.25	2.05	3.44E-04	1.75E+00
06:10	2260.300	84.23	7.29	2.01	3.53E-04	1.73E+00
07:10	2320.300	84.18	7.34	1.96	3.63E-04	1.71E+00
08:10	2380.300	84.15	7.37	1.93	3.72E-04	1.69E+00
09:10	2440.300	84.11	7.41	1.89	3.81E-04	1.68E+00
10:10	2500.300	84.08	7.44	1.86	3.91E-04	1.66E+00
11:10	2560.300	84.07	7.45	1.85	4.00E-04	1.64E+00
12:10	2620.400	84.04	7.48	1.82	4.09E-04	1.63E+00
13:10	2680.400	84.01	7.51	1.79	4.19E-04	1.62E+00
14:10	2740.400	83.96	7.56	1.74	4.28E-04	1.60E+00
15:10	2800.400	83.95	7.57	1.73	4.38E-04	1.59E+00
16:10	2860.400	83.91	7.61	1.69	4.47E-04	1.58E+00
17:10	2920.400	83.89	7.63	1.67	4.56E-04	1.57E+00
18:10	2980.400	83.86	7.66	1.64	4.66E-04	1.55E+00
19:10	3040.200	83.83	7.69	1.61	4.75E-04	1.54E+00
20:10	3100.200	83.79	7.73	1.57	4.84E-04	1.53E+00
21:10	3160.200	83.78	7.74	1.56	4.94E-04	1.52E+00
22:10	3220.200	83.73	7.79	1.51	5.03E-04	1.51E+00
23:10	3280.200	83.72	7.80	1.50	5.12E-04	1.50E+00
00:10	3340.200	83.69	7.83	1.47	5.22E-04	1.49E+00
01:10	3400.200	83.67	7.85	1.45	5.31E-04	1.49E+00
02:10	3460.200	83.66	7.86	1.44	5.41E-04	1.48E+00
03:10	3520.200	83.63	7.89	1.41	5.50E-04	1.47E+00
04:10	3580.300	83.62	7.90	1.40	5.59E-04	1.46E+00
05:10	3640.300	83.57	7.95	1.35	5.69E-04	1.45E+00
06:10	3700.300	83.57	7.95	1.35	5.78E-04	1.45E+00
07:10	3760.300	83.53	7.99	1.31	5.87E-04	1.44E+00
07:36	3786.600	83.51	8.01	1.29	5.92E-04	1.44E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 11 INPUT 12
RADIUS: 427.782 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 78.78 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
13:00	0.000	78.78	0.00	0.00E+00
13:00	0.017	-999.99	1078.77	6.45E-11
13:00	0.034	-999.99	1078.77	1.29E-10
13:00	0.050	-999.99	1078.77	1.90E-10
13:00	0.067	-999.99	1078.77	2.54E-10
13:00	0.084	-999.99	1078.77	3.19E-10
13:00	0.100	-999.99	1078.77	3.79E-10
13:00	0.117	-999.99	1078.77	4.44E-10
13:00	0.134	-999.99	1078.77	5.09E-10
13:00	0.150	-999.99	1078.77	5.69E-10
13:00	0.167	-999.99	1078.77	6.34E-10
13:00	0.257	78.78	0.00	9.75E-10
13:00	0.340	78.78	0.00	1.29E-09
13:00	0.424	78.78	0.00	1.61E-09
13:00	0.507	78.78	0.00	1.92E-09
13:00	0.590	78.78	0.00	2.24E-09
13:00	0.674	78.78	0.00	2.56E-09
13:00	0.757	78.78	0.00	2.87E-09
13:00	0.840	78.78	0.00	3.19E-09
13:00	0.924	78.78	0.00	3.51E-09
13:01	1.007	78.78	0.00	3.82E-09
13:01	1.417	78.78	0.00	5.38E-09
13:01	1.750	78.78	0.00	6.64E-09
13:02	2.084	78.79	-0.01	7.91E-09
13:02	2.417	78.79	-0.01	9.17E-09
13:02	2.750	78.79	-0.01	1.04E-08
13:03	3.084	78.79	-0.01	1.17E-08
13:03	3.417	78.78	0.00	1.30E-08
13:03	3.750	78.78	0.00	1.42E-08
13:04	4.084	78.78	0.00	1.55E-08
13:04	4.417	78.78	0.00	1.68E-08
13:04	4.750	78.78	0.00	1.80E-08
13:05	5.084	78.78	0.00	1.93E-08
13:05	5.417	78.78	0.00	2.06E-08
13:05	5.750	78.78	0.00	2.18E-08
13:06	6.084	78.78	0.00	2.31E-08
13:06	6.417	78.78	0.00	2.44E-08
13:06	6.750	78.78	0.00	2.56E-08
13:07	7.084	78.78	0.00	2.69E-08
13:07	7.417	78.78	0.00	2.81E-08

13:07	7.750	78.78	0.00	2.94E-08
13:08	8.084	78.78	0.00	3.07E-08
13:08	8.417	78.78	0.00	3.19E-08
13:08	8.750	78.78	0.00	3.32E-08
13:09	9.084	78.78	0.00	3.45E-08
13:09	9.417	78.78	0.00	3.57E-08
13:09	9.750	78.78	0.00	3.70E-08
13:10	10.084	78.79	-0.01	3.83E-08
13:12	12.101	78.80	-0.02	4.59E-08
13:14	14.188	78.82	-0.04	5.38E-08
13:16	16.139	78.83	-0.05	6.12E-08
13:18	18.237	78.84	-0.06	6.92E-08
13:20	20.233	78.86	-0.08	7.68E-08
13:22	22.233	78.88	-0.10	8.44E-08
13:24	24.233	78.91	-0.13	9.20E-08
13:26	26.233	78.93	-0.15	9.95E-08
13:28	28.233	78.96	-0.18	1.07E-07
13:30	30.233	78.98	-0.20	1.15E-07
13:32	32.152	79.00	-0.22	1.22E-07
13:34	34.620	79.04	-0.26	1.31E-07
13:36	36.095	79.05	-0.27	1.37E-07
13:38	38.095	79.08	-0.30	1.45E-07
13:40	40.095	79.11	-0.33	1.52E-07
13:42	42.195	79.13	-0.35	1.60E-07
13:44	44.232	79.15	-0.37	1.68E-07
13:46	46.232	79.18	-0.40	1.75E-07
13:48	48.252	79.21	-0.43	1.83E-07
13:50	50.122	79.23	-0.45	1.90E-07
13:52	52.122	79.25	-0.47	1.98E-07
13:54	54.122	79.30	-0.52	2.05E-07
13:56	56.122	79.32	-0.54	2.13E-07
13:58	58.122	79.35	-0.57	2.21E-07
14:00	60.122	79.37	-0.59	2.28E-07
14:02	62.122	79.39	-0.61	2.36E-07
14:04	64.122	79.41	-0.63	2.43E-07
14:06	66.442	79.44	-0.66	2.52E-07
14:08	68.122	79.47	-0.69	2.59E-07
14:10	70.335	79.50	-0.72	2.67E-07
14:12	72.160	79.52	-0.74	2.74E-07
14:14	74.160	79.54	-0.76	2.81E-07
14:16	76.167	79.57	-0.79	2.89E-07
14:18	78.230	79.60	-0.82	2.97E-07
14:20	80.217	79.62	-0.84	3.04E-07
14:22	82.213	79.64	-0.86	3.12E-07
14:24	84.213	79.67	-0.89	3.20E-07
14:26	86.213	79.69	-0.91	3.27E-07
14:28	88.213	79.72	-0.94	3.35E-07
14:30	90.213	79.74	-0.96	3.42E-07
14:32	92.213	79.77	-0.99	3.50E-07
14:34	94.213	79.79	-1.01	3.58E-07
14:36	96.213	79.81	-1.03	3.65E-07
14:38	98.238	79.84	-1.06	3.73E-07
15:00	120.220	80.09	-1.31	4.56E-07
15:20	140.130	80.29	-1.51	5.32E-07
15:40	160.130	80.47	-1.69	6.08E-07
16:00	180.370	80.63	-1.85	6.84E-07

16:20	200.200	80.78	-2.00	7.60E-07
16:40	220.200	80.93	-2.15	8.36E-07
17:00	240.080	81.06	-2.28	9.11E-07
17:20	260.220	81.19	-2.41	9.87E-07
17:40	280.150	81.31	-2.53	1.06E-06
18:00	300.150	81.43	-2.65	1.14E-06
18:20	320.130	81.54	-2.76	1.21E-06
18:40	340.220	81.66	-2.88	1.29E-06
19:00	360.180	81.76	-2.98	1.37E-06
19:20	380.220	81.87	-3.09	1.44E-06
19:40	400.220	81.98	-3.20	1.52E-06
20:00	420.220	82.08	-3.30	1.59E-06
20:20	440.220	82.18	-3.40	1.67E-06
20:40	460.220	82.27	-3.49	1.75E-06
21:00	480.120	82.37	-3.59	1.82E-06
21:20	500.220	82.46	-3.68	1.90E-06
21:40	520.320	82.55	-3.77	1.97E-06
22:00	540.200	82.65	-3.87	2.05E-06
22:20	560.100	82.74	-3.96	2.13E-06
22:40	580.100	82.83	-4.05	2.20E-06
23:00	600.150	82.92	-4.14	2.28E-06
23:20	620.150	83.03	-4.25	2.35E-06
23:40	640.180	83.11	-4.33	2.43E-06
00:00	660.180	83.21	-4.43	2.51E-06
00:20	680.180	83.30	-4.52	2.58E-06
00:40	700.180	83.39	-4.61	2.66E-06
01:00	720.180	83.48	-4.70	2.73E-06
01:20	740.180	83.57	-4.79	2.81E-06
01:40	760.180	83.67	-4.89	2.88E-06
02:00	780.180	83.76	-4.98	2.96E-06
02:20	800.180	83.85	-5.07	3.04E-06
02:40	820.180	83.93	-5.15	3.11E-06
03:00	840.180	84.02	-5.24	3.19E-06
03:20	860.180	84.10	-5.32	3.26E-06
03:40	880.180	84.18	-5.40	3.34E-06
04:00	900.180	84.25	-5.47	3.42E-06
04:20	920.180	84.32	-5.54	3.49E-06
04:40	940.180	84.38	-5.60	3.57E-06
05:00	960.180	84.45	-5.67	3.64E-06
05:20	980.180	84.51	-5.73	3.72E-06
05:40	1000.200	84.58	-5.80	3.80E-06
06:40	1060.400	84.76	-5.98	4.02E-06
07:40	1120.500	84.94	-6.16	4.25E-06
08:40	1180.300	85.11	-6.33	4.48E-06
09:40	1240.300	85.28	-6.50	4.71E-06
10:40	1300.200	85.45	-6.67	4.93E-06
11:40	1360.300	85.46	-6.68	5.16E-06
12:40	1420.300	85.33	-6.55	5.39E-06
13:40	1480.200	85.22	-6.44	5.62E-06
14:40	1540.300	85.15	-6.37	5.85E-06
15:40	1600.300	85.11	-6.33	6.07E-06
16:30	1650.600	85.11	-6.33	6.26E-06

TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 11 INPUT 12
RADIUS: 427.782 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 78.78 FEET
WATER STOP LEVEL: 85.11 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:30	0.017	-999.99	1085.10	1078.77	6.45E-11	9.71E+04
16:30	0.034	-999.99	1085.10	1078.77	1.29E-10	4.85E+04
16:30	0.050	-999.99	1085.10	1078.77	1.90E-10	3.30E+04
16:30	0.067	-999.99	1085.10	1078.77	2.54E-10	2.46E+04
16:30	0.084	-999.99	1085.10	1078.77	3.19E-10	1.97E+04
16:30	0.100	-999.99	1085.10	1078.77	3.79E-10	1.65E+04
16:30	0.117	-999.99	1085.10	1078.77	4.44E-10	1.41E+04
16:30	0.134	-999.99	1085.10	1078.77	5.09E-10	1.23E+04
16:30	0.150	-999.99	1085.10	1078.77	5.69E-10	1.10E+04
16:30	0.167	-999.99	1085.10	1078.77	6.34E-10	9.88E+03
16:30	0.257	85.11	0.00	6.33	9.75E-10	6.42E+03
16:30	0.340	85.11	0.00	6.33	1.29E-09	4.86E+03
16:30	0.424	85.11	0.00	6.33	1.61E-09	3.89E+03
16:30	0.507	85.11	0.00	6.33	1.92E-09	3.26E+03
16:30	0.591	85.11	0.00	6.33	2.24E-09	2.79E+03
16:30	0.674	85.11	0.00	6.33	2.56E-09	2.45E+03
16:30	0.757	85.11	0.00	6.33	2.87E-09	2.18E+03
16:30	0.840	85.11	0.00	6.33	3.19E-09	1.97E+03
16:30	0.924	85.11	0.00	6.33	3.51E-09	1.79E+03
16:31	1.007	85.11	0.00	6.33	3.82E-09	1.64E+03
16:31	1.417	85.11	0.00	6.33	5.38E-09	1.17E+03
16:31	1.751	85.11	0.00	6.33	6.64E-09	9.44E+02
16:32	2.084	85.11	0.00	6.33	7.91E-09	7.93E+02
16:32	2.417	85.11	0.00	6.33	9.17E-09	6.84E+02
16:32	2.751	85.11	0.00	6.33	1.04E-08	6.01E+02
16:33	3.084	85.11	0.00	6.33	1.17E-08	5.36E+02
16:33	3.417	85.11	0.00	6.33	1.30E-08	4.84E+02
16:33	3.751	85.11	0.00	6.33	1.42E-08	4.41E+02
16:34	4.084	85.11	0.00	6.33	1.55E-08	4.05E+02
16:34	4.417	85.11	0.00	6.33	1.68E-08	3.75E+02
16:34	4.751	85.11	0.00	6.33	1.80E-08	3.48E+02
16:35	5.084	85.11	0.00	6.33	1.93E-08	3.26E+02
16:35	5.417	85.11	0.00	6.33	2.06E-08	3.06E+02
16:35	5.751	85.11	0.00	6.33	2.18E-08	2.88E+02
16:36	6.084	85.11	0.00	6.33	2.31E-08	2.72E+02
16:36	6.417	85.11	0.00	6.33	2.44E-08	2.58E+02
16:36	6.751	85.11	0.00	6.33	2.56E-08	2.45E+02
16:37	7.084	85.11	0.00	6.33	2.69E-08	2.34E+02
16:37	7.417	85.11	0.00	6.33	2.81E-08	2.24E+02
16:37	7.751	85.11	0.00	6.33	2.94E-08	2.14E+02
16:38	8.084	85.11	0.00	6.33	3.07E-08	2.05E+02
16:38	8.417	85.11	0.00	6.33	3.19E-08	1.97E+02

16:38	8.751	85.11	0.00	6.33	3.32E-08	1.90E+02
16:39	9.084	85.11	0.00	6.33	3.45E-08	1.83E+02
16:39	9.417	85.11	0.00	6.33	3.57E-08	1.76E+02
16:39	9.751	85.11	0.00	6.33	3.70E-08	1.70E+02
16:40	10.084	85.11	0.00	6.33	3.83E-08	1.65E+02
16:42	12.120	85.10	0.01	6.32	4.60E-08	1.37E+02
16:44	14.120	85.09	0.02	6.31	5.36E-08	1.18E+02
16:46	16.120	85.08	0.03	6.30	6.12E-08	1.03E+02
16:48	18.120	85.06	0.05	6.28	6.88E-08	9.21E+01
16:50	20.142	85.05	0.06	6.27	7.64E-08	8.29E+01
16:52	22.225	85.03	0.08	6.25	8.43E-08	7.53E+01
16:54	24.225	85.02	0.09	6.24	9.19E-08	6.91E+01
16:56	26.225	85.00	0.11	6.22	9.95E-08	6.39E+01
16:58	28.225	84.98	0.13	6.20	1.07E-07	5.95E+01
17:00	30.225	84.97	0.14	6.19	1.15E-07	5.56E+01
17:02	32.225	84.95	0.16	6.17	1.22E-07	5.22E+01
17:04	34.225	84.93	0.18	6.15	1.30E-07	4.92E+01
17:06	36.225	84.91	0.20	6.13	1.37E-07	4.66E+01
17:08	38.225	84.90	0.21	6.12	1.45E-07	4.42E+01
17:10	40.225	84.88	0.23	6.10	1.53E-07	4.20E+01
17:12	42.225	84.86	0.25	6.08	1.60E-07	4.01E+01
17:14	44.225	84.84	0.27	6.06	1.68E-07	3.83E+01
17:16	46.225	84.83	0.28	6.05	1.75E-07	3.67E+01
17:18	48.225	84.81	0.30	6.03	1.83E-07	3.52E+01
17:20	50.342	84.79	0.32	6.01	1.91E-07	3.38E+01
17:22	52.220	84.77	0.34	5.99	1.98E-07	3.26E+01
17:24	54.222	84.76	0.35	5.98	2.06E-07	3.14E+01
17:26	56.222	84.74	0.37	5.96	2.13E-07	3.04E+01
17:28	58.220	84.72	0.39	5.94	2.21E-07	2.94E+01
17:30	60.120	84.70	0.41	5.92	2.28E-07	2.85E+01
17:32	62.220	84.69	0.42	5.91	2.36E-07	2.75E+01
17:34	64.222	84.67	0.44	5.89	2.44E-07	2.67E+01
17:36	66.220	84.66	0.45	5.88	2.51E-07	2.59E+01
17:38	68.220	84.64	0.47	5.86	2.59E-07	2.52E+01
17:40	70.220	84.62	0.49	5.84	2.66E-07	2.45E+01
17:42	72.220	84.61	0.50	5.83	2.74E-07	2.39E+01
17:44	74.222	84.59	0.52	5.81	2.82E-07	2.32E+01
17:46	76.095	84.58	0.53	5.80	2.89E-07	2.27E+01
17:48	78.180	84.56	0.55	5.78	2.97E-07	2.21E+01
17:50	80.575	84.54	0.57	5.76	3.06E-07	2.15E+01
17:52	82.215	84.53	0.58	5.75	3.12E-07	2.11E+01
17:54	84.215	84.51	0.60	5.73	3.20E-07	2.06E+01
17:56	86.215	84.50	0.61	5.72	3.27E-07	2.01E+01
17:58	88.215	84.48	0.63	5.70	3.35E-07	1.97E+01
18:00	90.493	84.47	0.64	5.69	3.43E-07	1.92E+01
18:02	92.210	84.45	0.66	5.67	3.50E-07	1.89E+01
18:04	94.248	84.44	0.67	5.66	3.58E-07	1.85E+01
18:06	96.248	84.42	0.69	5.64	3.65E-07	1.81E+01
18:08	98.248	84.41	0.70	5.63	3.73E-07	1.78E+01
18:30	120.250	84.26	0.85	5.48	4.56E-07	1.47E+01
18:50	140.250	84.13	0.98	5.35	5.32E-07	1.28E+01
19:10	160.180	84.00	1.11	5.22	6.08E-07	1.13E+01
19:30	180.170	83.89	1.22	5.11	6.84E-07	1.02E+01
19:50	200.220	83.78	1.33	5.00	7.60E-07	9.24E+00
20:10	220.150	83.67	1.44	4.89	8.35E-07	8.50E+00
20:30	240.150	83.58	1.53	4.80	9.11E-07	7.87E+00

20:50	260.150	83.48	1.63	4.70	9.87E-07	7.34E+00
21:10	280.250	83.40	1.71	4.62	1.06E-06	6.89E+00
21:30	300.250	83.31	1.80	4.53	1.14E-06	6.50E+00
21:50	320.250	83.23	1.88	4.45	1.22E-06	6.15E+00
22:10	340.250	83.15	1.96	4.37	1.29E-06	5.85E+00
22:30	360.220	83.08	2.03	4.30	1.37E-06	5.58E+00
22:50	380.080	83.01	2.10	4.23	1.44E-06	5.34E+00
23:10	400.080	82.94	2.17	4.16	1.52E-06	5.13E+00
23:30	420.150	82.88	2.23	4.10	1.59E-06	4.93E+00
23:50	440.080	82.81	2.30	4.03	1.67E-06	4.75E+00
00:10	460.220	82.75	2.36	3.97	1.75E-06	4.59E+00
00:30	480.220	82.69	2.42	3.91	1.82E-06	4.44E+00
00:50	500.220	82.64	2.47	3.86	1.90E-06	4.30E+00
01:10	520.220	82.58	2.53	3.80	1.97E-06	4.17E+00
01:30	540.220	82.53	2.58	3.75	2.05E-06	4.06E+00
01:50	560.220	82.48	2.63	3.70	2.13E-06	3.95E+00
02:10	580.220	82.43	2.68	3.65	2.20E-06	3.84E+00
02:30	600.220	82.38	2.73	3.60	2.28E-06	3.75E+00
02:50	620.220	82.34	2.77	3.56	2.35E-06	3.66E+00
03:10	640.220	82.29	2.82	3.51	2.43E-06	3.58E+00
03:30	660.220	82.25	2.86	3.47	2.51E-06	3.50E+00
03:50	680.220	82.20	2.91	3.42	2.58E-06	3.43E+00
04:10	700.220	82.16	2.95	3.38	2.66E-06	3.36E+00
04:30	720.220	82.12	2.99	3.34	2.73E-06	3.29E+00
04:50	740.220	82.08	3.03	3.30	2.81E-06	3.23E+00
05:10	760.220	82.04	3.07	3.26	2.88E-06	3.17E+00
05:30	780.220	82.00	3.11	3.22	2.96E-06	3.12E+00
05:50	800.220	81.97	3.14	3.19	3.04E-06	3.06E+00
06:10	820.220	81.93	3.18	3.15	3.11E-06	3.01E+00
06:30	840.220	81.90	3.21	3.12	3.19E-06	2.96E+00
06:50	860.220	81.87	3.24	3.09	3.26E-06	2.92E+00
07:10	880.180	81.84	3.27	3.06	3.34E-06	2.88E+00
07:30	900.180	81.81	3.30	3.03	3.42E-06	2.83E+00
07:50	920.180	81.78	3.33	3.00	3.49E-06	2.79E+00
08:10	940.180	81.75	3.36	2.97	3.57E-06	2.76E+00
08:30	960.180	81.73	3.38	2.95	3.64E-06	2.72E+00
08:50	980.170	81.70	3.41	2.92	3.72E-06	2.68E+00
09:10	1000.200	81.68	3.43	2.90	3.80E-06	2.65E+00
10:10	1060.400	81.61	3.50	2.83	4.02E-06	2.56E+00
11:10	1120.700	81.53	3.58	2.75	4.25E-06	2.47E+00
12:10	1180.300	81.46	3.65	2.68	4.48E-06	2.40E+00
13:10	1240.300	81.39	3.72	2.61	4.71E-06	2.33E+00
14:10	1300.400	81.33	3.78	2.55	4.93E-06	2.27E+00
15:10	1360.300	81.25	3.86	2.47	5.16E-06	2.21E+00
16:10	1420.200	81.19	3.92	2.41	5.39E-06	2.16E+00
17:10	1480.300	81.14	3.97	2.36	5.62E-06	2.12E+00
18:10	1540.300	81.08	4.03	2.30	5.85E-06	2.07E+00
19:10	1600.300	81.03	4.08	2.25	6.07E-06	2.03E+00
20:10	1660.300	80.98	4.13	2.20	6.30E-06	1.99E+00
21:10	1720.300	80.94	4.17	2.16	6.53E-06	1.96E+00
22:10	1780.300	80.90	4.21	2.12	6.76E-06	1.93E+00
23:10	1840.300	80.86	4.25	2.08	6.98E-06	1.90E+00
00:10	1900.300	80.82	4.29	2.04	7.21E-06	1.87E+00
01:10	1960.300	80.78	4.33	2.00	7.44E-06	1.84E+00
02:10	2020.300	80.74	4.37	1.96	7.67E-06	1.82E+00
03:10	2080.300	80.70	4.41	1.92	7.89E-06	1.79E+00

04:10	2140.300	80.67	4.44	1.89	8.12E-06	1.77E+00
05:10	2200.300	80.63	4.48	1.85	8.35E-06	1.75E+00
06:10	2260.300	80.59	4.52	1.81	8.58E-06	1.73E+00
07:10	2320.300	80.55	4.56	1.77	8.81E-06	1.71E+00
08:10	2380.300	80.53	4.58	1.75	9.03E-06	1.69E+00
09:10	2440.300	80.51	4.60	1.73	9.26E-06	1.68E+00
10:10	2500.300	80.49	4.62	1.71	9.49E-06	1.66E+00
11:10	2560.300	80.44	4.67	1.66	9.72E-06	1.64E+00
12:10	2620.400	80.43	4.68	1.65	9.94E-06	1.63E+00
13:10	2680.400	80.38	4.73	1.60	1.02E-05	1.62E+00
14:10	2740.400	80.37	4.74	1.59	1.04E-05	1.60E+00
15:10	2800.400	80.33	4.78	1.55	1.06E-05	1.59E+00
16:10	2860.400	80.29	4.82	1.51	1.09E-05	1.58E+00
17:10	2920.400	80.27	4.84	1.49	1.11E-05	1.57E+00
18:10	2980.400	80.24	4.87	1.46	1.13E-05	1.55E+00
19:10	3040.200	80.20	4.91	1.42	1.15E-05	1.54E+00
20:10	3100.200	80.18	4.93	1.40	1.18E-05	1.53E+00
21:10	3160.200	80.16	4.95	1.38	1.20E-05	1.52E+00
22:10	3220.200	80.15	4.96	1.37	1.22E-05	1.51E+00
23:10	3280.200	80.13	4.98	1.35	1.24E-05	1.50E+00
00:10	3340.200	80.11	5.00	1.33	1.27E-05	1.49E+00
01:10	3400.200	80.08	5.03	1.30	1.29E-05	1.49E+00
02:10	3460.200	80.06	5.05	1.28	1.31E-05	1.48E+00
03:10	3520.200	80.04	5.07	1.26	1.34E-05	1.47E+00
04:10	3580.300	80.02	5.09	1.24	1.36E-05	1.46E+00
05:10	3640.300	80.00	5.11	1.22	1.38E-05	1.45E+00
06:10	3700.300	79.98	5.13	1.20	1.40E-05	1.45E+00
07:10	3760.300	79.94	5.17	1.16	1.43E-05	1.44E+00
07:36	3786.600	79.93	5.18	1.15	1.44E-05	1.44E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 7 INPUT 5
RADIUS: 1012.704 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 80.77 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
13:00	0.000	80.77	0.00	0.00E+00
13:00	0.017	-999.99	1080.76	1.15E-11
13:00	0.034	-999.99	1080.76	2.30E-11
13:00	0.050	-999.99	1080.76	3.39E-11
13:00	0.067	-999.99	1080.76	4.54E-11
13:00	0.084	-999.99	1080.76	5.69E-11
13:00	0.100	-999.99	1080.76	6.77E-11
13:00	0.117	-999.99	1080.76	7.92E-11
13:00	0.134	-999.99	1080.76	9.07E-11
13:00	0.150	-999.99	1080.76	1.02E-10
13:00	0.167	-999.99	1080.76	1.13E-10
13:00	0.257	80.77	0.00	1.74E-10
13:00	0.340	80.77	0.00	2.30E-10
13:00	0.424	80.77	0.00	2.87E-10
13:00	0.507	80.77	0.00	3.43E-10
13:00	0.590	80.77	0.00	4.00E-10
13:00	0.674	80.77	0.00	4.56E-10
13:00	0.757	80.77	0.00	5.13E-10
13:00	0.840	80.77	0.00	5.69E-10
13:00	0.924	80.77	0.00	6.26E-10
13:01	1.007	80.77	0.00	6.82E-10
13:01	1.417	80.78	-0.01	9.59E-10
13:01	1.750	80.77	0.00	1.18E-09
13:02	2.084	80.77	0.00	1.41E-09
13:02	2.417	80.77	0.00	1.64E-09
13:02	2.750	80.78	-0.01	1.86E-09
13:03	3.084	80.77	0.00	2.09E-09
13:03	3.417	80.77	0.00	2.31E-09
13:03	3.750	80.77	0.00	2.54E-09
13:04	4.084	80.77	0.00	2.77E-09
13:04	4.417	80.77	0.00	2.99E-09
13:04	4.750	80.77	0.00	3.22E-09
13:05	5.084	80.77	0.00	3.44E-09
13:05	5.417	80.77	0.00	3.67E-09
13:05	5.750	80.76	0.01	3.89E-09
13:06	6.084	80.76	0.01	4.12E-09
13:06	6.417	80.76	0.01	4.35E-09
13:06	6.750	80.76	0.01	4.57E-09
13:07	7.084	80.76	0.01	4.80E-09
13:07	7.417	80.76	0.01	5.02E-09

13:07	7.750	80.76	0.01	5.25E-09
13:08	8.084	80.76	0.01	5.47E-09
13:08	8.417	80.76	0.01	5.70E-09
13:08	8.750	80.76	0.01	5.92E-09
13:09	9.084	80.76	0.01	6.15E-09
13:09	9.417	80.76	0.01	6.38E-09
13:09	9.750	80.76	0.01	6.60E-09
13:10	10.084	80.76	0.01	6.83E-09
13:12	12.101	80.76	0.01	8.19E-09
13:14	14.188	80.76	0.01	9.61E-09
13:16	16.139	80.76	0.01	1.09E-08
13:18	18.237	80.76	0.01	1.23E-08
13:20	20.233	80.75	0.02	1.37E-08
13:22	22.233	80.75	0.02	1.51E-08
13:24	24.233	80.75	0.02	1.64E-08
13:26	26.233	80.75	0.02	1.78E-08
13:28	28.233	80.75	0.02	1.91E-08
13:30	30.233	80.76	0.01	2.05E-08
13:32	32.152	80.75	0.02	2.18E-08
13:34	34.620	80.75	0.02	2.34E-08
13:36	36.095	80.75	0.02	2.44E-08
13:38	38.095	80.75	0.02	2.58E-08
13:40	40.095	80.75	0.02	2.71E-08
13:42	42.195	80.75	0.02	2.86E-08
13:44	44.232	80.75	0.02	3.00E-08
13:46	46.232	80.74	0.03	3.13E-08
13:48	48.252	80.75	0.02	3.27E-08
13:50	50.122	80.74	0.03	3.39E-08
13:52	52.122	80.75	0.02	3.53E-08
13:54	54.122	80.75	0.02	3.66E-08
13:56	56.122	80.75	0.02	3.80E-08
13:58	58.122	80.76	0.01	3.94E-08
14:00	60.122	80.75	0.02	4.07E-08
14:02	62.122	80.75	0.02	4.21E-08
14:04	64.122	80.75	0.02	4.34E-08
14:06	66.442	80.75	0.02	4.50E-08
14:08	68.122	80.75	0.02	4.61E-08
14:10	70.335	80.75	0.02	4.76E-08
14:12	72.160	80.76	0.01	4.89E-08
14:14	74.160	80.76	0.01	5.02E-08
14:16	76.167	80.76	0.01	5.16E-08
14:18	78.230	80.76	0.01	5.30E-08
14:20	80.217	80.75	0.02	5.43E-08
14:22	82.213	80.75	0.02	5.57E-08
14:24	84.213	80.75	0.02	5.70E-08
14:26	86.213	80.75	0.02	5.84E-08
14:28	88.213	80.76	0.01	5.97E-08
14:30	90.213	80.75	0.02	6.11E-08
14:32	92.213	80.75	0.02	6.24E-08
14:34	94.213	80.75	0.02	6.38E-08
14:36	96.213	80.75	0.02	6.51E-08
14:38	98.238	80.75	0.02	6.65E-08
15:00	120.220	80.75	0.02	8.14E-08
15:20	140.130	80.74	0.03	9.49E-08
15:40	160.130	80.75	0.02	1.08E-07
16:00	180.370	80.75	0.02	1.22E-07

16:20	200.200	80.75	0.02	1.36E-07
16:40	220.200	80.75	0.02	1.49E-07
17:00	240.080	80.75	0.02	1.63E-07
17:20	260.220	80.75	0.02	1.76E-07
17:40	280.150	80.75	0.02	1.90E-07
18:00	300.150	80.75	0.02	2.03E-07
18:20	320.130	80.75	0.02	2.17E-07
18:40	340.220	80.76	0.01	2.30E-07
19:00	360.180	80.76	0.01	2.44E-07
19:20	380.220	80.76	0.01	2.57E-07
19:40	400.220	80.77	0.00	2.71E-07
20:00	420.220	80.77	0.00	2.85E-07
20:20	440.220	80.78	-0.01	2.98E-07
20:40	460.220	80.79	-0.02	3.12E-07
21:00	480.120	80.80	-0.03	3.25E-07
21:20	500.220	80.80	-0.03	3.39E-07
21:40	520.320	80.81	-0.04	3.52E-07
22:00	540.200	80.82	-0.05	3.66E-07
22:20	560.100	80.82	-0.05	3.79E-07
22:40	580.100	80.83	-0.06	3.93E-07
23:00	600.150	80.84	-0.07	4.06E-07
23:20	620.150	80.85	-0.08	4.20E-07
23:40	640.180	80.86	-0.09	4.33E-07
00:00	660.180	80.87	-0.10	4.47E-07
00:20	680.180	80.87	-0.10	4.61E-07
00:40	700.180	80.88	-0.11	4.74E-07
01:00	720.180	80.89	-0.12	4.88E-07
01:20	740.180	80.90	-0.13	5.01E-07
01:40	760.180	80.91	-0.14	5.15E-07
02:00	780.180	80.92	-0.15	5.28E-07
02:20	800.180	80.93	-0.16	5.42E-07
02:40	820.180	80.93	-0.16	5.55E-07
03:00	840.180	80.94	-0.17	5.69E-07
03:20	860.180	80.95	-0.18	5.82E-07
03:40	880.180	80.96	-0.19	5.96E-07
04:00	900.180	80.97	-0.20	6.10E-07
04:20	920.180	80.98	-0.21	6.23E-07
04:40	940.180	80.99	-0.22	6.37E-07
05:00	960.180	81.00	-0.23	6.50E-07
05:20	980.180	81.01	-0.24	6.64E-07
05:40	1000.200	81.02	-0.25	6.77E-07
06:40	1060.400	81.05	-0.28	7.18E-07
07:40	1120.500	81.08	-0.31	7.59E-07
08:40	1180.300	81.12	-0.35	7.99E-07
09:40	1240.300	81.15	-0.38	8.40E-07
10:40	1300.200	81.20	-0.43	8.80E-07
11:40	1360.300	81.24	-0.47	9.21E-07
12:40	1420.300	81.25	-0.48	9.62E-07
13:40	1480.200	81.30	-0.53	1.00E-06
14:40	1540.300	81.30	-0.53	1.04E-06
15:40	1600.300	81.32	-0.55	1.08E-06
16:30	1650.600	81.34	-0.57	1.12E-06

TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 INPUT 5
RADIUS: 1012.704 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 80.77 FEET
WATER STOP LEVEL: 81.34 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:30	0.017	-999.99	1081.33	1080.76	1.15E-11	9.71E+04
16:30	0.034	-999.99	1081.33	1080.76	2.30E-11	4.85E+04
16:30	0.050	-999.99	1081.33	1080.76	3.39E-11	3.30E+04
16:30	0.067	-999.99	1081.33	1080.76	4.54E-11	2.46E+04
16:30	0.084	-999.99	1081.33	1080.76	5.69E-11	1.97E+04
16:30	0.100	-999.99	1081.33	1080.76	6.77E-11	1.65E+04
16:30	0.117	-999.99	1081.33	1080.76	7.92E-11	1.41E+04
16:30	0.134	-999.99	1081.33	1080.76	9.07E-11	1.23E+04
16:30	0.150	-999.99	1081.33	1080.76	1.02E-10	1.10E+04
16:30	0.167	-999.99	1081.33	1080.76	1.13E-10	9.88E+03
16:30	0.257	81.34	0.00	0.57	1.74E-10	6.42E+03
16:30	0.340	81.34	0.00	0.57	2.30E-10	4.86E+03
16:30	0.424	81.35	-0.01	0.58	2.87E-10	3.89E+03
16:30	0.507	81.35	-0.01	0.58	3.43E-10	3.26E+03
16:30	0.591	81.34	0.00	0.57	4.00E-10	2.79E+03
16:30	0.674	81.34	0.00	0.57	4.56E-10	2.45E+03
16:30	0.757	81.34	0.00	0.57	5.13E-10	2.18E+03
16:30	0.840	81.34	0.00	0.57	5.69E-10	1.97E+03
16:30	0.924	81.34	0.00	0.57	6.26E-10	1.79E+03
16:31	1.007	81.34	0.00	0.57	6.82E-10	1.64E+03
16:31	1.417	81.35	-0.01	0.58	9.59E-10	1.17E+03
16:31	1.751	81.35	-0.01	0.58	1.19E-09	9.44E+02
16:32	2.084	81.35	-0.01	0.58	1.41E-09	7.93E+02
16:32	2.417	81.35	-0.01	0.58	1.64E-09	6.84E+02
16:32	2.751	81.35	-0.01	0.58	1.86E-09	6.01E+02
16:33	3.084	81.35	-0.01	0.58	2.09E-09	5.36E+02
16:33	3.417	81.35	-0.01	0.58	2.31E-09	4.84E+02
16:33	3.751	81.35	-0.01	0.58	2.54E-09	4.41E+02
16:34	4.084	81.35	-0.01	0.58	2.77E-09	4.05E+02
16:34	4.417	81.35	-0.01	0.58	2.99E-09	3.75E+02
16:34	4.751	81.35	-0.01	0.58	3.22E-09	3.48E+02
16:35	5.084	81.35	-0.01	0.58	3.44E-09	3.26E+02
16:35	5.417	81.35	-0.01	0.58	3.67E-09	3.06E+02
16:35	5.751	81.35	-0.01	0.58	3.89E-09	2.88E+02
16:36	6.084	81.35	-0.01	0.58	4.12E-09	2.72E+02
16:36	6.417	81.35	-0.01	0.58	4.35E-09	2.58E+02
16:36	6.751	81.35	-0.01	0.58	4.57E-09	2.45E+02
16:37	7.084	81.35	-0.01	0.58	4.80E-09	2.34E+02
16:37	7.417	81.35	-0.01	0.58	5.02E-09	2.24E+02
16:37	7.751	81.35	-0.01	0.58	5.25E-09	2.14E+02
16:38	8.084	81.35	-0.01	0.58	5.47E-09	2.05E+02
16:38	8.417	81.35	-0.01	0.58	5.70E-09	1.97E+02

16:38	8.751	81.35	-0.01	0.58	5.93E-09	1.90E+02
16:39	9.084	81.35	-0.01	0.58	6.15E-09	1.83E+02
16:39	9.417	81.35	-0.01	0.58	6.38E-09	1.76E+02
16:39	9.751	81.35	-0.01	0.58	6.60E-09	1.70E+02
16:40	10.084	81.35	-0.01	0.58	6.83E-09	1.65E+02
16:42	12.120	81.35	-0.01	0.58	8.21E-09	1.37E+02
16:44	14.120	81.35	-0.01	0.58	9.56E-09	1.18E+02
16:46	16.120	81.35	-0.01	0.58	1.09E-08	1.03E+02
16:48	18.120	81.35	-0.01	0.58	1.23E-08	9.21E+01
16:50	20.142	81.35	-0.01	0.58	1.36E-08	8.29E+01
16:52	22.225	81.35	-0.01	0.58	1.50E-08	7.53E+01
16:54	24.225	81.35	-0.01	0.58	1.64E-08	6.91E+01
16:56	26.225	81.36	-0.02	0.59	1.78E-08	6.39E+01
16:58	28.225	81.36	-0.02	0.59	1.91E-08	5.95E+01
17:00	30.225	81.36	-0.02	0.59	2.05E-08	5.56E+01
17:02	32.225	81.35	-0.01	0.58	2.18E-08	5.22E+01
17:04	34.225	81.35	-0.01	0.58	2.32E-08	4.92E+01
17:06	36.225	81.35	-0.01	0.58	2.45E-08	4.66E+01
17:08	38.225	81.35	-0.01	0.58	2.59E-08	4.42E+01
17:10	40.225	81.36	-0.02	0.59	2.72E-08	4.20E+01
17:12	42.225	81.36	-0.02	0.59	2.86E-08	4.01E+01
17:14	44.225	81.36	-0.02	0.59	2.99E-08	3.83E+01
17:16	46.225	81.36	-0.02	0.59	3.13E-08	3.67E+01
17:18	48.225	81.36	-0.02	0.59	3.27E-08	3.52E+01
17:20	50.342	81.36	-0.02	0.59	3.41E-08	3.38E+01
17:22	52.220	81.36	-0.02	0.59	3.54E-08	3.26E+01
17:24	54.222	81.36	-0.02	0.59	3.67E-08	3.14E+01
17:26	56.222	81.36	-0.02	0.59	3.81E-08	3.04E+01
17:28	58.220	81.36	-0.02	0.59	3.94E-08	2.94E+01
17:30	60.120	81.36	-0.02	0.59	4.07E-08	2.85E+01
17:32	62.220	81.36	-0.02	0.59	4.21E-08	2.75E+01
17:34	64.222	81.36	-0.02	0.59	4.35E-08	2.67E+01
17:36	66.220	81.36	-0.02	0.59	4.48E-08	2.59E+01
17:38	68.220	81.36	-0.02	0.59	4.62E-08	2.52E+01
17:40	70.220	81.36	-0.02	0.59	4.75E-08	2.45E+01
17:42	72.220	81.37	-0.03	0.60	4.89E-08	2.39E+01
17:44	74.222	81.36	-0.02	0.59	5.03E-08	2.32E+01
17:46	76.095	81.37	-0.03	0.60	5.15E-08	2.27E+01
17:48	78.180	81.37	-0.03	0.60	5.29E-08	2.21E+01
17:50	80.575	81.37	-0.03	0.60	5.46E-08	2.15E+01
17:52	82.215	81.37	-0.03	0.60	5.57E-08	2.11E+01
17:54	84.215	81.37	-0.03	0.60	5.70E-08	2.06E+01
17:56	86.215	81.37	-0.03	0.60	5.84E-08	2.01E+01
17:58	88.215	81.37	-0.03	0.60	5.97E-08	1.97E+01
18:00	90.493	81.37	-0.03	0.60	6.13E-08	1.92E+01
18:02	92.210	81.37	-0.03	0.60	6.24E-08	1.89E+01
18:04	94.248	81.37	-0.03	0.60	6.38E-08	1.85E+01
18:06	96.248	81.37	-0.03	0.60	6.52E-08	1.81E+01
18:08	98.248	81.37	-0.03	0.60	6.65E-08	1.78E+01
18:30	120.250	81.38	-0.04	0.61	8.14E-08	1.47E+01
18:50	140.250	81.39	-0.05	0.62	9.50E-08	1.28E+01
19:10	160.180	81.39	-0.05	0.62	1.08E-07	1.13E+01
19:30	180.170	81.40	-0.06	0.63	1.22E-07	1.02E+01
19:50	200.220	81.40	-0.06	0.63	1.36E-07	9.24E+00
20:10	220.150	81.41	-0.07	0.64	1.49E-07	8.50E+00
20:30	240.150	81.42	-0.08	0.65	1.63E-07	7.87E+00

20:50	260.150	81.42	-0.08	0.65	1.76E-07	7.34E+00
21:10	280.250	81.43	-0.09	0.66	1.90E-07	6.89E+00
21:30	300.250	81.43	-0.09	0.66	2.03E-07	6.50E+00
21:50	320.250	81.44	-0.10	0.67	2.17E-07	6.15E+00
22:10	340.250	81.44	-0.10	0.67	2.30E-07	5.85E+00
22:30	360.220	81.44	-0.10	0.67	2.44E-07	5.58E+00
22:50	380.080	81.45	-0.11	0.68	2.57E-07	5.34E+00
23:10	400.080	81.45	-0.11	0.68	2.71E-07	5.13E+00
23:30	420.150	81.45	-0.11	0.68	2.84E-07	4.93E+00
23:50	440.080	81.46	-0.12	0.69	2.98E-07	4.75E+00
00:10	460.220	81.45	-0.11	0.68	3.12E-07	4.59E+00
00:30	480.220	81.46	-0.12	0.69	3.25E-07	4.44E+00
00:50	500.220	81.46	-0.12	0.69	3.39E-07	4.30E+00
01:10	520.220	81.46	-0.12	0.69	3.52E-07	4.17E+00
01:30	540.220	81.45	-0.11	0.68	3.66E-07	4.06E+00
01:50	560.220	81.45	-0.11	0.68	3.79E-07	3.95E+00
02:10	580.220	81.45	-0.11	0.68	3.93E-07	3.84E+00
02:30	600.220	81.45	-0.11	0.68	4.06E-07	3.75E+00
02:50	620.220	81.45	-0.11	0.68	4.20E-07	3.66E+00
03:10	640.220	81.45	-0.11	0.68	4.34E-07	3.58E+00
03:30	660.220	81.45	-0.11	0.68	4.47E-07	3.50E+00
03:50	680.220	81.44	-0.10	0.67	4.61E-07	3.43E+00
04:10	700.220	81.44	-0.10	0.67	4.74E-07	3.36E+00
04:30	720.220	81.44	-0.10	0.67	4.88E-07	3.29E+00
04:50	740.220	81.44	-0.10	0.67	5.01E-07	3.23E+00
05:10	760.220	81.43	-0.09	0.66	5.15E-07	3.17E+00
05:30	780.220	81.43	-0.09	0.66	5.28E-07	3.12E+00
05:50	800.220	81.43	-0.09	0.66	5.42E-07	3.06E+00
06:10	820.220	81.43	-0.09	0.66	5.55E-07	3.01E+00
06:30	840.220	81.42	-0.08	0.65	5.69E-07	2.96E+00
06:50	860.220	81.42	-0.08	0.65	5.82E-07	2.92E+00
07:10	880.180	81.42	-0.08	0.65	5.96E-07	2.88E+00
07:30	900.180	81.42	-0.08	0.65	6.10E-07	2.83E+00
07:50	920.180	81.42	-0.08	0.65	6.23E-07	2.79E+00
08:10	940.180	81.41	-0.07	0.64	6.37E-07	2.76E+00
08:30	960.180	81.41	-0.07	0.64	6.50E-07	2.72E+00
08:50	980.170	81.40	-0.06	0.63	6.64E-07	2.68E+00
09:10	1000.200	81.40	-0.06	0.63	6.77E-07	2.65E+00
10:10	1060.400	81.40	-0.06	0.63	7.18E-07	2.56E+00
11:10	1120.700	81.41	-0.07	0.64	7.59E-07	2.47E+00
12:10	1180.300	81.41	-0.07	0.64	7.99E-07	2.40E+00
13:10	1240.300	81.39	-0.05	0.62	8.40E-07	2.33E+00
14:10	1300.400	81.39	-0.05	0.62	8.81E-07	2.27E+00
15:10	1360.300	81.37	-0.03	0.60	9.21E-07	2.21E+00
16:10	1420.200	81.35	-0.01	0.58	9.62E-07	2.16E+00
17:10	1480.300	81.35	-0.01	0.58	1.00E-06	2.12E+00
18:10	1540.300	81.33	0.01	0.56	1.04E-06	2.07E+00
19:10	1600.300	81.33	0.01	0.56	1.08E-06	2.03E+00
20:10	1660.300	81.32	0.02	0.55	1.12E-06	1.99E+00
21:10	1720.300	81.32	0.02	0.55	1.16E-06	1.96E+00
22:10	1780.300	81.31	0.03	0.54	1.21E-06	1.93E+00
23:10	1840.300	81.30	0.04	0.53	1.25E-06	1.90E+00
00:10	1900.300	81.30	0.04	0.53	1.29E-06	1.87E+00
01:10	1960.300	81.29	0.05	0.52	1.33E-06	1.84E+00
02:10	2020.300	81.28	0.06	0.51	1.37E-06	1.82E+00
03:10	2080.300	81.27	0.07	0.50	1.41E-06	1.79E+00

04:10	2140.300	81.26	0.08	0.49	1.45E-06	1.77E+00
05:10	2200.300	81.25	0.09	0.48	1.49E-06	1.75E+00
06:10	2260.300	81.24	0.10	0.47	1.53E-06	1.73E+00
07:10	2320.300	81.24	0.10	0.47	1.57E-06	1.71E+00
08:10	2380.300	81.23	0.11	0.46	1.61E-06	1.69E+00
09:10	2440.300	81.23	0.11	0.46	1.65E-06	1.68E+00
10:10	2500.300	81.23	0.11	0.46	1.69E-06	1.66E+00
11:10	2560.300	81.22	0.12	0.45	1.73E-06	1.64E+00
12:10	2620.400	81.24	0.10	0.47	1.77E-06	1.63E+00
13:10	2680.400	81.21	0.13	0.44	1.81E-06	1.62E+00
14:10	2740.400	81.23	0.11	0.46	1.86E-06	1.60E+00
15:10	2800.400	81.22	0.12	0.45	1.90E-06	1.59E+00
16:10	2860.400	81.19	0.15	0.42	1.94E-06	1.58E+00
17:10	2920.400	81.18	0.16	0.41	1.98E-06	1.57E+00
18:10	2980.400	81.17	0.17	0.40	2.02E-06	1.55E+00
19:10	3040.200	81.16	0.18	0.39	2.06E-06	1.54E+00
20:10	3100.200	81.16	0.18	0.39	2.10E-06	1.53E+00
21:10	3160.200	81.15	0.19	0.38	2.14E-06	1.52E+00
22:10	3220.200	81.15	0.19	0.38	2.18E-06	1.51E+00
23:10	3280.200	81.14	0.20	0.37	2.22E-06	1.50E+00
00:10	3340.200	81.14	0.20	0.37	2.26E-06	1.49E+00
01:10	3400.200	81.13	0.21	0.36	2.30E-06	1.49E+00
02:10	3460.200	81.13	0.21	0.36	2.34E-06	1.48E+00
03:10	3520.200	81.12	0.22	0.35	2.38E-06	1.47E+00
04:10	3580.300	81.11	0.23	0.34	2.42E-06	1.46E+00
05:10	3640.300	81.11	0.23	0.34	2.46E-06	1.45E+00
06:10	3700.300	81.10	0.24	0.33	2.51E-06	1.45E+00
07:10	3760.300	81.08	0.26	0.31	2.55E-06	1.44E+00
07:36	3786.600	81.08	0.26	0.31	2.56E-06	1.44E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 3-4 INPUT 4
RADIUS: 784.360 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 81.18 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
13:00	0.000	81.18	0.00	0.00E+00
13:00	0.017	-999.99	1081.17	1.92E-11
13:00	0.034	-999.99	1081.17	3.84E-11
13:00	0.050	-999.99	1081.17	5.64E-11
13:00	0.067	-999.99	1081.17	7.56E-11
13:00	0.084	-999.99	1081.17	9.48E-11
13:00	0.100	-999.99	1081.17	1.13E-10
13:00	0.117	-999.99	1081.17	1.32E-10
13:00	0.134	-999.99	1081.17	1.51E-10
13:00	0.150	-999.99	1081.17	1.69E-10
13:00	0.167	-999.99	1081.17	1.89E-10
13:00	0.257	81.18	0.00	2.90E-10
13:00	0.340	81.18	0.00	3.84E-10
13:00	0.424	81.18	0.00	4.79E-10
13:00	0.507	81.18	0.00	5.72E-10
13:00	0.590	81.18	0.00	6.66E-10
13:00	0.674	81.18	0.00	7.61E-10
13:00	0.757	81.18	0.00	8.54E-10
13:00	0.840	81.18	0.00	9.48E-10
13:00	0.924	81.19	-0.01	1.04E-09
13:01	1.007	81.19	-0.01	1.14E-09
13:01	1.417	81.19	-0.01	1.60E-09
13:01	1.750	81.19	-0.01	1.98E-09
13:02	2.084	81.19	-0.01	2.35E-09
13:02	2.417	81.19	-0.01	2.73E-09
13:02	2.750	81.19	-0.01	3.10E-09
13:03	3.084	81.19	-0.01	3.48E-09
13:03	3.417	81.19	-0.01	3.86E-09
13:03	3.750	81.18	0.00	4.23E-09
13:04	4.084	81.18	0.00	4.61E-09
13:04	4.417	81.18	0.00	4.99E-09
13:04	4.750	81.18	0.00	5.36E-09
13:05	5.084	81.18	0.00	5.74E-09
13:05	5.417	81.18	0.00	6.11E-09
13:05	5.750	81.18	0.00	6.49E-09
13:06	6.084	81.18	0.00	6.87E-09
13:06	6.417	81.17	0.01	7.24E-09
13:06	6.750	81.17	0.01	7.62E-09
13:07	7.084	81.17	0.01	8.00E-09
13:07	7.417	81.17	0.01	8.37E-09

13:07	7.750	81.17	0.01	8.75E-09
13:08	8.084	81.17	0.01	9.13E-09
13:08	8.417	81.17	0.01	9.50E-09
13:08	8.750	81.17	0.01	9.88E-09
13:09	9.084	81.17	0.01	1.03E-08
13:09	9.417	81.17	0.01	1.06E-08
13:09	9.750	81.17	0.01	1.10E-08
13:10	10.084	81.17	0.01	1.14E-08
13:12	12.101	81.17	0.01	1.37E-08
13:14	14.188	81.18	0.00	1.60E-08
13:16	16.139	81.18	0.00	1.82E-08
13:18	18.237	81.17	0.01	2.06E-08
13:20	20.233	81.18	0.00	2.28E-08
13:22	22.233	81.17	0.01	2.51E-08
13:24	24.233	81.17	0.01	2.74E-08
13:26	26.233	81.18	0.00	2.96E-08
13:28	28.233	81.18	0.00	3.19E-08
13:30	30.233	81.18	0.00	3.41E-08
13:32	32.152	81.19	-0.01	3.63E-08
13:34	34.620	81.19	-0.01	3.91E-08
13:36	36.095	81.20	-0.02	4.07E-08
13:38	38.095	81.20	-0.02	4.30E-08
13:40	40.095	81.21	-0.03	4.53E-08
13:42	42.195	81.22	-0.04	4.76E-08
13:44	44.232	81.22	-0.04	4.99E-08
13:46	46.232	81.23	-0.05	5.22E-08
13:48	48.252	81.24	-0.06	5.45E-08
13:50	50.122	81.25	-0.07	5.66E-08
13:52	52.122	81.26	-0.08	5.88E-08
13:54	54.122	81.27	-0.09	6.11E-08
13:56	56.122	81.29	-0.11	6.33E-08
13:58	58.122	81.31	-0.13	6.56E-08
14:00	60.122	81.31	-0.13	6.79E-08
14:02	62.122	81.32	-0.14	7.01E-08
14:04	64.122	81.33	-0.15	7.24E-08
14:06	66.442	81.35	-0.17	7.50E-08
14:08	68.122	81.36	-0.18	7.69E-08
14:10	70.335	81.38	-0.20	7.94E-08
14:12	72.160	81.39	-0.21	8.15E-08
14:14	74.160	81.40	-0.22	8.37E-08
14:16	76.167	81.42	-0.24	8.60E-08
14:18	78.230	81.43	-0.25	8.83E-08
14:20	80.217	81.45	-0.27	9.05E-08
14:22	82.213	81.46	-0.28	9.28E-08
14:24	84.213	81.48	-0.30	9.51E-08
14:26	86.213	81.49	-0.31	9.73E-08
14:28	88.213	81.50	-0.32	9.96E-08
14:30	90.213	81.52	-0.34	1.02E-07
14:32	92.213	81.54	-0.36	1.04E-07
14:34	94.213	81.55	-0.37	1.06E-07
14:36	96.213	81.56	-0.38	1.09E-07
14:38	98.238	81.58	-0.40	1.11E-07
15:00	120.220	81.75	-0.57	1.36E-07
15:20	140.130	81.90	-0.72	1.58E-07
15:40	160.130	82.06	-0.88	1.81E-07
16:00	180.370	82.22	-1.04	2.04E-07

16:20	200.200	82.36	-1.18	2.26E-07
16:40	220.200	82.50	-1.32	2.49E-07
17:00	240.080	82.63	-1.45	2.71E-07
17:20	260.220	82.76	-1.58	2.94E-07
17:40	280.150	82.88	-1.70	3.16E-07
18:00	300.150	82.99	-1.81	3.39E-07
18:20	320.130	83.10	-1.92	3.61E-07
18:40	340.220	83.20	-2.02	3.84E-07
19:00	360.180	83.30	-2.12	4.07E-07
19:20	380.220	83.41	-2.23	4.29E-07
19:40	400.220	83.50	-2.32	4.52E-07
20:00	420.220	83.60	-2.42	4.74E-07
20:20	440.220	83.69	-2.51	4.97E-07
20:40	460.220	83.79	-2.61	5.19E-07
21:00	480.120	83.88	-2.70	5.42E-07
21:20	500.220	83.97	-2.79	5.65E-07
21:40	520.320	84.05	-2.87	5.87E-07
22:00	540.200	84.14	-2.96	6.10E-07
22:20	560.100	84.22	-3.04	6.32E-07
22:40	580.100	84.30	-3.12	6.55E-07
23:00	600.150	84.38	-3.20	6.77E-07
23:20	620.150	84.46	-3.28	7.00E-07
23:40	640.180	84.55	-3.37	7.23E-07
00:00	660.180	84.63	-3.45	7.45E-07
00:20	680.180	84.71	-3.53	7.68E-07
00:40	700.180	84.79	-3.61	7.90E-07
01:00	720.180	84.88	-3.70	8.13E-07
01:20	740.180	84.96	-3.78	8.35E-07
01:40	760.180	85.04	-3.86	8.58E-07
02:00	780.180	85.12	-3.94	8.81E-07
02:20	800.180	85.20	-4.02	9.03E-07
02:40	820.180	85.28	-4.10	9.26E-07
03:00	840.180	85.36	-4.18	9.48E-07
03:20	860.180	85.43	-4.25	9.71E-07
03:40	880.180	85.51	-4.33	9.94E-07
04:00	900.180	85.58	-4.40	1.02E-06
04:20	920.180	85.65	-4.47	1.04E-06
04:40	940.180	85.72	-4.54	1.06E-06
05:00	960.180	85.78	-4.60	1.08E-06
05:20	980.180	85.84	-4.66	1.11E-06
05:40	1000.200	85.91	-4.73	1.13E-06
06:40	1060.400	86.09	-4.91	1.20E-06
07:40	1120.500	86.25	-5.07	1.26E-06
08:40	1180.300	86.41	-5.23	1.33E-06
09:40	1240.300	86.57	-5.39	1.40E-06
10:40	1300.200	86.71	-5.53	1.47E-06
11:40	1360.300	86.83	-5.65	1.54E-06
12:40	1420.300	86.83	-5.65	1.60E-06
13:40	1480.200	86.79	-5.61	1.67E-06
14:40	1540.300	86.72	-5.54	1.74E-06
15:40	1600.300	86.68	-5.50	1.81E-06
16:30	1650.600	86.68	-5.50	1.86E-06

TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 INPUT 4
RADIUS: 784.360 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 81.18 FEET
WATER STOP LEVEL: 86.68 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
16:30	0.017	-999.99	1086.67	1081.17	1.92E-11	9.71E+04
16:30	0.034	-999.99	1086.67	1081.17	3.84E-11	4.85E+04
16:30	0.050	-999.99	1086.67	1081.17	5.64E-11	3.30E+04
16:30	0.067	-999.99	1086.67	1081.17	7.56E-11	2.46E+04
16:30	0.084	-999.99	1086.67	1081.17	9.48E-11	1.97E+04
16:30	0.100	-999.99	1086.67	1081.17	1.13E-10	1.65E+04
16:30	0.117	-999.99	1086.67	1081.17	1.32E-10	1.41E+04
16:30	0.134	-999.99	1086.67	1081.17	1.51E-10	1.23E+04
16:30	0.150	-999.99	1086.67	1081.17	1.69E-10	1.10E+04
16:30	0.167	-999.99	1086.67	1081.17	1.89E-10	9.88E+03
16:30	0.257	86.68	0.00	5.50	2.90E-10	6.42E+03
16:30	0.340	86.68	0.00	5.50	3.84E-10	4.86E+03
16:30	0.424	86.68	0.00	5.50	4.79E-10	3.89E+03
16:30	0.507	86.68	0.00	5.50	5.72E-10	3.26E+03
16:30	0.591	86.68	0.00	5.50	6.67E-10	2.79E+03
16:30	0.674	86.68	0.00	5.50	7.61E-10	2.45E+03
16:30	0.757	86.67	0.01	5.49	8.54E-10	2.18E+03
16:30	0.840	86.68	0.00	5.50	9.48E-10	1.97E+03
16:30	0.924	86.68	0.00	5.50	1.04E-09	1.79E+03
16:31	1.007	86.68	0.00	5.50	1.14E-09	1.64E+03
16:31	1.417	86.68	0.00	5.50	1.60E-09	1.17E+03
16:31	1.751	86.68	0.00	5.50	1.98E-09	9.44E+02
16:32	2.084	86.67	0.01	5.49	2.35E-09	7.93E+02
16:32	2.417	86.68	0.00	5.50	2.73E-09	6.84E+02
16:32	2.751	86.68	0.00	5.50	3.11E-09	6.01E+02
16:33	3.084	86.68	0.00	5.50	3.48E-09	5.36E+02
16:33	3.417	86.67	0.01	5.49	3.86E-09	4.84E+02
16:33	3.751	86.68	0.00	5.50	4.23E-09	4.41E+02
16:34	4.084	86.68	0.00	5.50	4.61E-09	4.05E+02
16:34	4.417	86.68	0.00	5.50	4.99E-09	3.75E+02
16:34	4.751	86.67	0.01	5.49	5.36E-09	3.48E+02
16:35	5.084	86.67	0.01	5.49	5.74E-09	3.26E+02
16:35	5.417	86.67	0.01	5.49	6.11E-09	3.06E+02
16:35	5.751	86.68	0.00	5.50	6.49E-09	2.88E+02
16:36	6.084	86.67	0.01	5.49	6.87E-09	2.72E+02
16:36	6.417	86.68	0.00	5.50	7.24E-09	2.58E+02
16:36	6.751	86.67	0.01	5.49	7.62E-09	2.45E+02
16:37	7.084	86.68	0.00	5.50	8.00E-09	2.34E+02
16:37	7.417	86.68	0.00	5.50	8.37E-09	2.24E+02
16:37	7.751	86.68	0.00	5.50	8.75E-09	2.14E+02
16:38	8.084	86.68	0.00	5.50	9.13E-09	2.05E+02
16:38	8.417	86.68	0.00	5.50	9.50E-09	1.97E+02

16:38	8.751	86.68	0.00	5.50	9.88E-09	1.90E+02
16:39	9.084	86.68	0.00	5.50	1.03E-08	1.83E+02
16:39	9.417	86.68	0.00	5.50	1.06E-08	1.76E+02
16:39	9.751	86.68	0.00	5.50	1.10E-08	1.70E+02
16:40	10.084	86.68	0.00	5.50	1.14E-08	1.65E+02
16:42	12.120	86.67	0.01	5.49	1.37E-08	1.37E+02
16:44	14.120	86.67	0.01	5.49	1.59E-08	1.18E+02
16:46	16.120	86.67	0.01	5.49	1.82E-08	1.03E+02
16:48	18.120	86.67	0.01	5.49	2.05E-08	9.21E+01
16:50	20.142	86.67	0.01	5.49	2.27E-08	8.29E+01
16:52	22.225	86.66	0.02	5.48	2.51E-08	7.53E+01
16:54	24.225	86.66	0.02	5.48	2.73E-08	6.91E+01
16:56	26.225	86.66	0.02	5.48	2.96E-08	6.39E+01
16:58	28.225	86.66	0.02	5.48	3.19E-08	5.95E+01
17:00	30.225	86.65	0.03	5.47	3.41E-08	5.56E+01
17:02	32.225	86.65	0.03	5.47	3.64E-08	5.22E+01
17:04	34.225	86.65	0.03	5.47	3.86E-08	4.92E+01
17:06	36.225	86.64	0.04	5.46	4.09E-08	4.66E+01
17:08	38.225	86.64	0.04	5.46	4.31E-08	4.42E+01
17:10	40.225	86.63	0.05	5.45	4.54E-08	4.20E+01
17:12	42.225	86.63	0.05	5.45	4.77E-08	4.01E+01
17:14	44.225	86.62	0.06	5.44	4.99E-08	3.83E+01
17:16	46.225	86.62	0.06	5.44	5.22E-08	3.67E+01
17:18	48.225	86.61	0.07	5.43	5.44E-08	3.52E+01
17:20	50.342	86.61	0.07	5.43	5.68E-08	3.38E+01
17:22	52.220	86.60	0.08	5.42	5.89E-08	3.26E+01
17:24	54.222	86.59	0.09	5.41	6.12E-08	3.14E+01
17:26	56.222	86.58	0.10	5.40	6.35E-08	3.04E+01
17:28	58.220	86.58	0.10	5.40	6.57E-08	2.94E+01
17:30	60.120	86.57	0.11	5.39	6.79E-08	2.85E+01
17:32	62.220	86.56	0.12	5.38	7.02E-08	2.75E+01
17:34	64.222	86.55	0.13	5.37	7.25E-08	2.67E+01
17:36	66.220	86.54	0.14	5.36	7.47E-08	2.59E+01
17:38	68.220	86.54	0.14	5.36	7.70E-08	2.52E+01
17:40	70.220	86.53	0.15	5.35	7.93E-08	2.45E+01
17:42	72.220	86.52	0.16	5.34	8.15E-08	2.39E+01
17:44	74.222	86.51	0.17	5.33	8.38E-08	2.32E+01
17:46	76.095	86.50	0.18	5.32	8.59E-08	2.27E+01
17:48	78.180	86.50	0.18	5.32	8.82E-08	2.21E+01
17:50	80.575	86.48	0.20	5.30	9.10E-08	2.15E+01
17:52	82.215	86.48	0.20	5.30	9.28E-08	2.11E+01
17:54	84.215	86.47	0.21	5.29	9.51E-08	2.06E+01
17:56	86.215	86.45	0.23	5.27	9.73E-08	2.01E+01
17:58	88.215	86.45	0.23	5.27	9.96E-08	1.97E+01
18:00	90.493	86.44	0.24	5.26	1.02E-07	1.92E+01
18:02	92.210	86.43	0.25	5.25	1.04E-07	1.89E+01
18:04	94.248	86.42	0.26	5.24	1.06E-07	1.85E+01
18:06	96.248	86.41	0.27	5.23	1.09E-07	1.81E+01
18:08	98.248	86.40	0.28	5.22	1.11E-07	1.78E+01
18:30	120.250	86.29	0.39	5.11	1.36E-07	1.47E+01
18:50	140.250	86.18	0.50	5.00	1.58E-07	1.28E+01
19:10	160.180	86.08	0.60	4.90	1.81E-07	1.13E+01
19:30	180.170	85.98	0.70	4.80	2.03E-07	1.02E+01
19:50	200.220	85.88	0.80	4.70	2.26E-07	9.24E+00
20:10	220.150	85.79	0.89	4.61	2.48E-07	8.50E+00
20:30	240.150	85.70	0.98	4.52	2.71E-07	7.87E+00

20:50	260.150	85.61	1.07	4.43	2.94E-07	7.34E+00
21:10	280.250	85.53	1.15	4.35	3.16E-07	6.89E+00
21:30	300.250	85.45	1.23	4.27	3.39E-07	6.50E+00
21:50	320.250	85.38	1.30	4.20	3.61E-07	6.15E+00
22:10	340.250	85.30	1.38	4.12	3.84E-07	5.85E+00
22:30	360.220	85.23	1.45	4.05	4.07E-07	5.58E+00
22:50	380.080	85.16	1.52	3.98	4.29E-07	5.34E+00
23:10	400.080	85.10	1.58	3.92	4.52E-07	5.13E+00
23:30	420.150	85.03	1.65	3.85	4.74E-07	4.93E+00
23:50	440.080	84.97	1.71	3.79	4.97E-07	4.75E+00
00:10	460.220	84.91	1.77	3.73	5.19E-07	4.59E+00
00:30	480.220	84.85	1.83	3.67	5.42E-07	4.44E+00
00:50	500.220	84.80	1.88	3.62	5.65E-07	4.30E+00
01:10	520.220	84.74	1.94	3.56	5.87E-07	4.17E+00
01:30	540.220	84.69	1.99	3.51	6.10E-07	4.06E+00
01:50	560.220	84.64	2.04	3.46	6.32E-07	3.95E+00
02:10	580.220	84.59	2.09	3.41	6.55E-07	3.84E+00
02:30	600.220	84.54	2.14	3.36	6.78E-07	3.75E+00
02:50	620.220	84.50	2.18	3.32	7.00E-07	3.66E+00
03:10	640.220	84.45	2.23	3.27	7.23E-07	3.58E+00
03:30	660.220	84.41	2.27	3.23	7.45E-07	3.50E+00
03:50	680.220	84.36	2.32	3.18	7.68E-07	3.43E+00
04:10	700.220	84.32	2.36	3.14	7.90E-07	3.36E+00
04:30	720.220	84.28	2.40	3.10	8.13E-07	3.29E+00
04:50	740.220	84.24	2.44	3.06	8.36E-07	3.23E+00
05:10	760.220	84.21	2.47	3.03	8.58E-07	3.17E+00
05:30	780.220	84.17	2.51	2.99	8.81E-07	3.12E+00
05:50	800.220	84.13	2.55	2.95	9.03E-07	3.06E+00
06:10	820.220	84.10	2.58	2.92	9.26E-07	3.01E+00
06:30	840.220	84.07	2.61	2.89	9.48E-07	2.96E+00
06:50	860.220	84.03	2.65	2.85	9.71E-07	2.92E+00
07:10	880.180	84.00	2.68	2.82	9.94E-07	2.88E+00
07:30	900.180	83.97	2.71	2.79	1.02E-06	2.83E+00
07:50	920.180	83.94	2.74	2.76	1.04E-06	2.79E+00
08:10	940.180	83.92	2.76	2.74	1.06E-06	2.76E+00
08:30	960.180	83.89	2.79	2.71	1.08E-06	2.72E+00
08:50	980.170	83.87	2.81	2.69	1.11E-06	2.68E+00
09:10	1000.200	83.84	2.84	2.66	1.13E-06	2.65E+00
10:10	1060.400	83.78	2.90	2.60	1.20E-06	2.56E+00
11:10	1120.700	83.71	2.97	2.53	1.27E-06	2.47E+00
12:10	1180.300	83.64	3.04	2.46	1.33E-06	2.40E+00
13:10	1240.300	83.56	3.12	2.38	1.40E-06	2.33E+00
14:10	1300.400	83.51	3.17	2.33	1.47E-06	2.27E+00
15:10	1360.300	83.43	3.25	2.25	1.54E-06	2.21E+00
16:10	1420.200	83.38	3.30	2.20	1.60E-06	2.16E+00
17:10	1480.300	83.34	3.34	2.16	1.67E-06	2.12E+00
18:10	1540.300	83.28	3.40	2.10	1.74E-06	2.07E+00
19:10	1600.300	83.23	3.45	2.05	1.81E-06	2.03E+00
20:10	1660.300	83.18	3.50	2.00	1.87E-06	1.99E+00
21:10	1720.300	83.14	3.54	1.96	1.94E-06	1.96E+00
22:10	1780.300	83.11	3.57	1.93	2.01E-06	1.93E+00
23:10	1840.300	83.07	3.61	1.89	2.08E-06	1.90E+00
00:10	1900.300	83.03	3.65	1.85	2.15E-06	1.87E+00
01:10	1960.300	82.99	3.69	1.81	2.21E-06	1.84E+00
02:10	2020.300	82.95	3.73	1.77	2.28E-06	1.82E+00
03:10	2080.300	82.92	3.76	1.74	2.35E-06	1.79E+00

04:10	2140.300	82.88	3.80	1.70	2.42E-06	1.77E+00
05:10	2200.300	82.84	3.84	1.66	2.48E-06	1.75E+00
06:10	2260.300	82.81	3.87	1.63	2.55E-06	1.73E+00
07:10	2320.300	82.77	3.91	1.59	2.62E-06	1.71E+00
08:10	2380.300	82.75	3.93	1.57	2.69E-06	1.69E+00
09:10	2440.300	82.73	3.95	1.55	2.75E-06	1.68E+00
10:10	2500.300	82.71	3.97	1.53	2.82E-06	1.66E+00
11:10	2560.300	82.66	4.02	1.48	2.89E-06	1.64E+00
12:10	2620.400	82.66	4.02	1.48	2.96E-06	1.63E+00
13:10	2680.400	82.61	4.07	1.43	3.03E-06	1.62E+00
14:10	2740.400	82.61	4.07	1.43	3.09E-06	1.60E+00
15:10	2800.400	82.57	4.11	1.39	3.16E-06	1.59E+00
16:10	2860.400	82.54	4.14	1.36	3.23E-06	1.58E+00
17:10	2920.400	82.53	4.15	1.35	3.30E-06	1.57E+00
18:10	2980.400	82.50	4.18	1.32	3.36E-06	1.55E+00
19:10	3040.200	82.47	4.21	1.29	3.43E-06	1.54E+00
20:10	3100.200	82.44	4.24	1.26	3.50E-06	1.53E+00
21:10	3160.200	82.43	4.25	1.25	3.57E-06	1.52E+00
22:10	3220.200	82.41	4.27	1.23	3.63E-06	1.51E+00
23:10	3280.200	82.39	4.29	1.21	3.70E-06	1.50E+00
00:10	3340.200	82.38	4.30	1.20	3.77E-06	1.49E+00
01:10	3400.200	82.35	4.33	1.17	3.84E-06	1.49E+00
02:10	3460.200	82.33	4.35	1.15	3.91E-06	1.48E+00
03:10	3520.200	82.31	4.37	1.13	3.97E-06	1.47E+00
04:10	3580.300	82.29	4.39	1.11	4.04E-06	1.46E+00
05:10	3640.300	82.27	4.41	1.09	4.11E-06	1.45E+00
06:10	3700.300	82.25	4.43	1.07	4.18E-06	1.45E+00
07:10	3760.300	82.22	4.46	1.04	4.24E-06	1.44E+00
07:36	3786.600	82.21	4.47	1.03	4.27E-06	1.44E+00

PROJECT NAME: FRENCH, LTD.
PROJECT NUMBER: 275-14
TEST NAME: REI 10-1 RUN #1
TEST DATE: 15-Sep-86
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 12-1 INPUT 1
LEVEL (F) TOC (ADJ.)
RADIUS: 1492.112 FEET
STARTING WATER LEVEL: 78.050 FEET (ADJ.)

ELAPSED TIME (MIN - ADJ)	LEVEL (FEET) (ADJ.)	DELTA HEAD (FEET)	t/r2
28.000	78.06	0.01	8.73E-09
58.000	78.07	0.02	1.81E-08
88.000	78.06	0.01	2.74E-08
118.000	78.05	0.00	3.68E-08
148.000	78.04	-0.01	4.62E-08
178.000	78.01	-0.04	5.55E-08
208.000	78.02	-0.03	6.49E-08
238.000	78.06	0.01	7.42E-08
268.000	78.12	0.07	8.36E-08
298.000	78.17	0.12	9.30E-08
328.000	78.24	0.19	1.02E-07
358.000	78.31	0.26	1.12E-07
388.000	78.39	0.34	1.21E-07
418.000	78.47	0.42	1.30E-07
448.000	78.55	0.50	1.40E-07
478.000	78.64	0.59	1.49E-07
508.000	78.72	0.67	1.58E-07
538.000	78.82	0.77	1.68E-07
568.000	78.91	0.86	1.77E-07
598.000	79.00	0.95	1.87E-07
628.000	79.09	1.04	1.96E-07
658.000	79.18	1.13	2.05E-07
688.000	79.27	1.22	2.15E-07
718.000	79.36	1.31	2.24E-07
748.000	79.45	1.40	2.33E-07
778.000	79.55	1.50	2.43E-07
808.000	79.64	1.59	2.52E-07
838.000	79.73	1.68	2.61E-07
868.000	79.83	1.78	2.71E-07
898.000	79.92	1.87	2.80E-07
928.000	80.02	1.97	2.89E-07
958.000	80.12	2.07	2.99E-07
988.000	80.21	2.16	3.08E-07
1018.000	80.31	2.26	3.18E-07
1048.000	80.40	2.35	3.27E-07
1078.000	80.50	2.45	3.36E-07
1108.000	80.60	2.55	3.46E-07
1138.000	80.69	2.64	3.55E-07
1168.000	80.79	2.74	3.64E-07
1198.000	80.88	2.83	3.74E-07
1228.000	80.97	2.92	3.83E-07
1258.000	81.07	3.02	3.92E-07

1288.000	81.16	3.11	4.02E-07
1318.000	81.26	3.21	4.11E-07
1348.000	81.35	3.30	4.20E-07
1378.000	81.44	3.39	4.30E-07
1408.000	81.52	3.47	4.39E-07
1438.000	81.61	3.56	4.49E-07
1468.000	81.69	3.64	4.58E-07
1498.000	81.75	3.70	4.67E-07
1528.000	81.81	3.76	4.77E-07
1558.000	81.86	3.81	4.86E-07
1588.000	81.92	3.87	4.95E-07
1618.000	81.98	3.93	5.05E-07
1648.000	82.03	3.98	5.14E-07
1678.000	82.08	4.03	5.23E-07
1708.000	82.12	4.07	5.33E-07
1738.000	82.17	4.12	5.42E-07
1768.000	82.20	4.15	5.51E-07
1798.000	82.23	4.18	5.61E-07
1828.000	82.25	4.20	5.70E-07
1858.000	82.27	4.22	5.80E-07
1888.000	82.28	4.23	5.89E-07
1918.000	82.28	4.23	5.98E-07
1948.000	82.28	4.23	6.08E-07
1978.000	82.28	4.23	6.17E-07
2008.000	82.27	4.22	6.26E-07
2038.000	82.25	4.20	6.36E-07
2068.000	82.24	4.19	6.45E-07
2098.000	82.21	4.16	6.54E-07
2128.000	82.19	4.14	6.64E-07
2158.000	82.16	4.11	6.73E-07
2188.000	82.14	4.09	6.82E-07
2218.000	82.11	4.06	6.92E-07
2248.000	82.08	4.03	7.01E-07
2278.000	82.04	3.99	7.11E-07
2308.000	82.01	3.96	7.20E-07
2338.000	81.98	3.93	7.29E-07
2368.000	81.95	3.90	7.39E-07
2398.000	81.91	3.86	7.48E-07
2428.000	81.87	3.82	7.57E-07
2458.000	81.83	3.78	7.67E-07
2488.000	81.80	3.75	7.76E-07
2518.000	81.77	3.72	7.85E-07
2548.000	81.74	3.69	7.95E-07
2578.000	81.70	3.65	8.04E-07
2608.000	81.67	3.62	8.13E-07
2638.000	81.62	3.57	8.23E-07
2668.000	81.59	3.54	8.32E-07
2698.000	81.56	3.51	8.42E-07
2728.000	81.53	3.48	8.51E-07
2758.000	81.50	3.45	8.60E-07
2788.000	81.48	3.43	8.70E-07
2818.000	81.45	3.40	8.79E-07
2848.000	81.41	3.36	8.88E-07
2878.000	81.38	3.33	8.98E-07
2908.000	81.35	3.30	9.07E-07
2938.000	81.32	3.27	9.16E-07
2968.000	81.29	3.24	9.26E-07
2998.000	81.24	3.19	9.35E-07

3028.000	81.20	3.15	9.44E-07
3058.000	81.17	3.12	9.54E-07
3088.000	81.14	3.09	9.63E-07
3118.000	81.12	3.07	9.73E-07
3148.000	81.09	3.04	9.82E-07
3178.000	81.05	3.00	9.91E-07
3208.000	81.02	2.97	1.00E-06
3238.000	80.99	2.94	1.01E-06
3268.000	80.96	2.91	1.02E-06
3298.000	80.93	2.88	1.03E-06
3328.000	80.91	2.86	1.04E-06
3358.000	80.88	2.83	1.05E-06
3388.000	80.86	2.81	1.06E-06
3418.000	80.84	2.79	1.07E-06
3448.000	80.81	2.76	1.08E-06
3478.000	80.79	2.74	1.08E-06
3508.000	80.77	2.72	1.09E-06
3538.000	80.74	2.69	1.10E-06
3568.000	80.72	2.67	1.11E-06
3598.000	80.69	2.64	1.12E-06
3628.000	80.67	2.62	1.13E-06
3658.000	80.65	2.60	1.14E-06
3688.000	80.62	2.57	1.15E-06
3718.000	80.60	2.55	1.16E-06
3748.000	80.58	2.53	1.17E-06
3778.000	80.55	2.50	1.18E-06
3808.000	80.53	2.48	1.19E-06
3838.000	80.51	2.46	1.20E-06
3868.000	80.48	2.43	1.21E-06
3898.000	80.46	2.41	1.22E-06
3928.000	80.44	2.39	1.23E-06
3958.000	80.42	2.37	1.23E-06
3988.000	80.40	2.35	1.24E-06
4018.000	80.38	2.33	1.25E-06
4048.000	80.36	2.31	1.26E-06
4078.000	80.34	2.29	1.27E-06
4108.000	80.33	2.28	1.28E-06
4138.000	80.31	2.26	1.29E-06
4168.000	80.30	2.25	1.30E-06
4198.000	80.28	2.23	1.31E-06
4228.000	80.26	2.21	1.32E-06
4258.000	80.25	2.20	1.33E-06
4288.000	80.23	2.18	1.34E-06
4318.000	80.20	2.15	1.35E-06
4348.000	80.19	2.14	1.36E-06
4378.000	80.17	2.12	1.37E-06
4408.000	80.17	2.12	1.37E-06
4438.000	80.15	2.10	1.38E-06
4468.000	80.13	2.08	1.39E-06
4498.000	80.11	2.06	1.40E-06
4528.000	80.08	2.03	1.41E-06
4558.000	80.07	2.02	1.42E-06
4588.000	80.04	1.99	1.43E-06
4618.000	80.02	1.97	1.44E-06
4648.000	80.00	1.95	1.45E-06
4678.000	79.98	1.93	1.46E-06
4708.000	79.96	1.91	1.47E-06
4738.000	79.95	1.90	1.48E-06

4768.000	79.93	1.88	1.49E-06
4798.000	79.92	1.87	1.50E-06
4828.000	79.90	1.85	1.51E-06
4858.000	79.89	1.84	1.52E-06
4888.000	79.88	1.83	1.52E-06
4918.000	79.87	1.82	1.53E-06
4948.000	79.86	1.81	1.54E-06
4978.000	79.84	1.79	1.55E-06
5008.000	79.83	1.78	1.56E-06
5038.000	79.82	1.77	1.57E-06
5068.000	79.80	1.75	1.58E-06
5098.000	79.79	1.74	1.59E-06
5128.000	79.78	1.73	1.60E-06
5158.000	79.76	1.71	1.61E-06
5188.000	79.75	1.70	1.62E-06
5218.000	79.73	1.68	1.63E-06
5248.000	79.72	1.67	1.64E-06
5278.000	79.70	1.65	1.65E-06
5308.000	79.69	1.64	1.66E-06
5338.000	79.67	1.62	1.66E-06
5368.000	79.65	1.60	1.67E-06
5398.000	79.63	1.58	1.68E-06
5428.000	79.61	1.56	1.69E-06
5458.000	79.60	1.55	1.70E-06
5488.000	79.60	1.55	1.71E-06
5518.000	79.57	1.52	1.72E-06
5548.000	79.56	1.51	1.73E-06
5578.000	79.55	1.50	1.74E-06
5608.000	79.54	1.49	1.75E-06
5638.000	79.53	1.48	1.76E-06
5668.000	79.52	1.47	1.77E-06
5698.000	79.51	1.46	1.78E-06
5728.000	79.49	1.44	1.79E-06
5758.000	79.48	1.43	1.80E-06
5788.000	79.48	1.43	1.81E-06
5818.000	79.48	1.43	1.81E-06
5848.000	79.49	1.44	1.82E-06
5878.000	79.51	1.46	1.83E-06
5908.000	79.54	1.49	1.84E-06
5938.000	79.58	1.53	1.85E-06
5968.000	79.64	1.59	1.86E-06

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: P 10-2 INPUT 6
RADIUS: 20.845 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 46.07 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	46.07	0.00
13:00	0.017	-999.99	1046.06
13:00	0.034	-999.99	1046.06
13:00	0.050	-999.99	1046.06
13:00	0.067	-999.99	1046.06
13:00	0.084	-999.99	1046.06
13:00	0.100	-999.99	1046.06
13:00	0.117	-999.99	1046.06
13:00	0.134	-999.99	1046.06
13:00	0.150	-999.99	1046.06
13:00	0.167	-999.99	1046.06
13:00	0.257	46.06	0.01
13:00	0.340	46.06	0.01
13:00	0.424	46.06	0.01
13:00	0.507	46.05	0.02
13:00	0.590	46.05	0.02
13:00	0.674	46.05	0.02
13:00	0.757	46.05	0.02
13:00	0.840	46.06	0.01
13:00	0.924	46.05	0.02
13:01	1.007	46.05	0.02
13:01	1.417	46.06	0.01
13:01	1.750	46.06	0.01
13:02	2.084	46.06	0.01
13:02	2.417	46.05	0.02
13:02	2.750	46.06	0.01
13:03	3.084	46.05	0.02
13:03	3.417	46.05	0.02
13:03	3.750	46.04	0.03
13:04	4.084	46.04	0.03
13:04	4.417	46.04	0.03
13:04	4.750	46.03	0.04
13:05	5.084	46.02	0.05
13:05	5.417	46.02	0.05
13:05	5.750	46.01	0.06
13:06	6.084	46.00	0.07
13:06	6.417	46.00	0.07
13:06	6.750	45.99	0.08
13:07	7.084	45.99	0.08
13:07	7.417	45.98	0.09

13:07	7.750	45.98	0.09
13:08	8.084	45.98	0.09
13:08	8.417	45.98	0.09
13:08	8.750	45.98	0.09
13:09	9.084	45.98	0.09
13:09	9.417	45.98	0.09
13:09	9.750	45.98	0.09
13:10	10.084	45.98	0.09
13:12	12.101	45.99	0.08
13:14	14.188	46.00	0.07
13:16	16.139	45.99	0.08
13:18	18.237	45.98	0.09
13:20	20.233	45.97	0.10
13:22	22.233	45.96	0.11
13:24	24.233	45.96	0.11
13:26	26.233	45.96	0.11
13:28	28.233	45.97	0.10
13:30	30.233	45.96	0.11
13:32	32.152	45.97	0.10
13:34	34.620	45.97	0.10
13:36	36.095	45.97	0.10
13:38	38.095	45.98	0.09
13:40	40.095	45.97	0.10
13:42	42.195	45.98	0.09
13:44	44.232	45.97	0.10
13:46	46.232	45.96	0.11
13:48	48.252	45.96	0.11
13:50	50.122	45.97	0.10
13:52	52.122	45.99	0.08
13:54	54.122	46.00	0.07
13:56	56.122	46.00	0.07
13:58	58.122	46.01	0.06
14:00	60.122	46.02	0.05
14:02	62.122	46.00	0.07
14:04	64.122	46.00	0.07
14:06	66.442	46.00	0.07
14:08	68.122	46.01	0.06
14:10	70.335	46.02	0.05
14:12	72.160	46.03	0.04
14:14	74.160	46.03	0.04
14:16	76.167	46.03	0.04
14:18	78.230	46.02	0.05
14:20	80.217	46.03	0.04
14:22	82.213	46.03	0.04
14:24	84.213	46.02	0.05
14:26	86.213	46.02	0.05
14:28	88.213	46.01	0.06
14:30	90.213	46.00	0.07
14:32	92.213	46.01	0.06
14:34	94.213	46.00	0.07
14:36	96.213	46.00	0.07
14:38	98.238	45.99	0.08
15:00	120.220	46.01	0.06
15:20	140.130	45.99	0.08
15:40	160.130	46.00	0.07
16:00	180.370	45.99	0.08

16:20	200.200	45.99	0.08
16:40	220.200	46.00	0.07
17:00	240.080	46.00	0.07
17:20	260.220	46.00	0.07
17:40	280.150	46.01	0.06
18:00	300.150	45.97	0.10
18:20	320.130	45.98	0.09
18:40	340.220	45.99	0.08
19:00	360.180	46.00	0.07
19:20	380.220	46.00	0.07
19:40	400.220	45.98	0.09
20:00	420.220	45.96	0.11
20:20	440.220	45.96	0.11
20:40	460.220	45.97	0.10
21:00	480.120	45.97	0.10
21:20	500.220	45.97	0.10
21:40	520.320	45.97	0.10
22:00	540.200	45.98	0.09
22:20	560.100	45.98	0.09
22:40	580.100	45.98	0.09
23:00	600.150	45.98	0.09
23:20	620.150	45.98	0.09
23:40	640.180	46.00	0.07
00:00	660.180	45.98	0.09
00:20	680.180	45.98	0.09
00:40	700.180	45.96	0.11
01:00	720.180	45.96	0.11
01:20	740.180	45.97	0.10
01:40	760.180	46.01	0.06
02:00	780.180	46.01	0.06
02:20	800.180	45.99	0.08
02:40	820.180	45.98	0.09
03:00	840.180	45.98	0.09
03:20	860.180	45.97	0.10
03:40	880.180	45.97	0.10
04:00	900.180	45.96	0.11
04:20	920.180	45.96	0.11
04:40	940.180	45.96	0.11
05:00	960.180	45.96	0.11
05:20	980.180	45.95	0.12
05:40	1000.200	45.95	0.12
06:40	1060.400	45.94	0.13
07:40	1120.500	45.93	0.14
08:40	1180.300	45.94	0.13
09:40	1240.300	45.94	0.13
10:40	1300.200	45.95	0.12
11:40	1360.300	45.99	0.08
12:40	1420.300	45.99	0.08
13:40	1480.200	46.04	0.03
14:40	1540.300	45.97	0.10
15:40	1600.300	45.98	0.09
16:30	1650.600	45.98	0.09

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: P 10-2 INPUT 6
RADIUS: 20.845 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 46.07 FEET
WATER STOP LEVEL: 45.98 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1045.97	1046.06
16:30	0.034	-999.99	1045.97	1046.06
16:30	0.050	-999.99	1045.97	1046.06
16:30	0.067	-999.99	1045.97	1046.06
16:30	0.084	-999.99	1045.97	1046.06
16:30	0.100	-999.99	1045.97	1046.06
16:30	0.117	-999.99	1045.97	1046.06
16:30	0.134	-999.99	1045.97	1046.06
16:30	0.150	-999.99	1045.97	1046.06
16:30	0.167	-999.99	1045.97	1046.06
16:30	0.257	45.98	0.00	0.09
16:30	0.340	45.98	0.00	0.09
16:30	0.424	45.98	0.00	0.09
16:30	0.507	45.98	0.00	0.09
16:30	0.591	45.99	-0.01	0.08
16:30	0.674	45.99	-0.01	0.08
16:30	0.757	45.99	-0.01	0.08
16:30	0.840	45.99	-0.01	0.08
16:30	0.924	45.99	-0.01	0.08
16:31	1.007	45.99	-0.01	0.08
16:31	1.417	45.99	-0.01	0.08
16:31	1.751	46.00	-0.02	0.07
16:32	2.084	46.00	-0.02	0.07
16:32	2.417	46.00	-0.02	0.07
16:32	2.751	46.01	-0.03	0.06
16:33	3.084	46.01	-0.03	0.06
16:33	3.417	46.01	-0.03	0.06
16:33	3.751	46.01	-0.03	0.06
16:34	4.084	46.02	-0.04	0.05
16:34	4.417	46.02	-0.04	0.05
16:34	4.751	46.03	-0.05	0.04
16:35	5.084	46.03	-0.05	0.04
16:35	5.417	46.03	-0.05	0.04
16:35	5.751	46.03	-0.05	0.04
16:36	6.084	46.04	-0.06	0.03
16:36	6.417	46.05	-0.07	0.02
16:36	6.751	46.05	-0.07	0.02
16:37	7.084	46.06	-0.08	0.01

16:37	7.417	46.07	-0.09	0.00
16:37	7.751	46.07	-0.09	0.00
16:38	8.084	46.07	-0.09	0.00
16:38	8.417	46.08	-0.10	0.01
16:38	8.751	46.08	-0.10	0.01
16:39	9.084	46.08	-0.10	0.01
16:39	9.417	46.08	-0.10	0.01
16:39	9.751	46.09	-0.11	0.02
16:40	10.084	46.09	-0.11	0.02
16:42	12.120	46.09	-0.11	0.02
16:44	14.120	46.08	-0.10	0.01
16:46	16.120	46.05	-0.07	0.02
16:48	18.120	46.03	-0.05	0.04
16:50	20.142	46.03	-0.05	0.04
16:52	22.225	46.03	-0.05	0.04
16:54	24.225	46.03	-0.05	0.04
16:56	26.225	46.02	-0.04	0.05
16:58	28.225	46.02	-0.04	0.05
17:00	30.225	46.02	-0.04	0.05
17:02	32.225	46.02	-0.04	0.05
17:04	34.225	46.02	-0.04	0.05
17:06	36.225	46.01	-0.03	0.06
17:08	38.225	46.01	-0.03	0.06
17:10	40.225	46.01	-0.03	0.06
17:12	42.225	46.02	-0.04	0.05
17:14	44.225	46.01	-0.03	0.06
17:16	46.225	46.01	-0.03	0.06
17:18	48.225	46.01	-0.03	0.06
17:20	50.342	46.01	-0.03	0.06
17:22	52.220	46.01	-0.03	0.06
17:24	54.222	46.01	-0.03	0.06
17:26	56.222	46.01	-0.03	0.06
17:28	58.220	46.01	-0.03	0.06
17:30	60.120	46.01	-0.03	0.06
17:32	62.220	46.01	-0.03	0.06
17:34	64.222	46.01	-0.03	0.06
17:36	66.220	46.01	-0.03	0.06
17:38	68.220	46.01	-0.03	0.06
17:40	70.220	46.01	-0.03	0.06
17:42	72.220	46.01	-0.03	0.06
17:44	74.222	46.02	-0.04	0.05
17:46	76.095	46.02	-0.04	0.05
17:48	78.180	46.03	-0.05	0.04
17:50	80.575	46.03	-0.05	0.04
17:52	82.215	46.03	-0.05	0.04
17:54	84.215	46.03	-0.05	0.04
17:56	86.215	46.03	-0.05	0.04
17:58	88.215	46.02	-0.04	0.05
18:00	90.493	46.02	-0.04	0.05
18:02	92.210	46.02	-0.04	0.05
18:04	94.248	46.02	-0.04	0.05
18:06	96.248	46.02	-0.04	0.05
18:08	98.248	46.02	-0.04	0.05
18:30	120.250	46.03	-0.05	0.04
18:50	140.250	46.03	-0.05	0.04
19:10	160.180	46.02	-0.04	0.05

19:30	180.170	46.02	-0.04	0.05
19:50	200.220	46.03	-0.05	0.04
20:10	220.150	46.03	-0.05	0.04
20:30	240.150	46.02	-0.04	0.05
20:50	260.150	46.03	-0.05	0.04
21:10	280.250	46.03	-0.05	0.04
21:30	300.250	46.03	-0.05	0.04
21:50	320.250	46.03	-0.05	0.04
22:10	340.250	46.03	-0.05	0.04
22:30	360.220	46.03	-0.05	0.04
22:50	380.080	46.03	-0.05	0.04
23:10	400.080	46.03	-0.05	0.04
23:30	420.150	46.03	-0.05	0.04
23:50	440.080	46.04	-0.06	0.03
00:10	460.220	46.03	-0.05	0.04
00:30	480.220	46.04	-0.06	0.03
00:50	500.220	46.03	-0.05	0.04
01:10	520.220	46.03	-0.05	0.04
01:30	540.220	46.04	-0.06	0.03
01:50	560.220	46.05	-0.07	0.02
02:10	580.220	46.06	-0.08	0.01
02:30	600.220	46.06	-0.08	0.01
02:50	620.220	46.06	-0.08	0.01
03:10	640.220	46.06	-0.08	0.01
03:30	660.220	46.05	-0.07	0.02
03:50	680.220	46.05	-0.07	0.02
04:10	700.220	46.05	-0.07	0.02
04:30	720.220	46.04	-0.06	0.03
04:50	740.220	46.04	-0.06	0.03
05:10	760.220	46.03	-0.05	0.04
05:30	780.220	46.03	-0.05	0.04
05:50	800.220	46.03	-0.05	0.04
06:10	820.220	46.03	-0.05	0.04
06:30	840.220	46.02	-0.04	0.05
06:50	860.220	46.03	-0.05	0.04
07:10	880.180	45.98	0.00	0.09
07:30	900.180	45.97	0.01	0.10
07:50	920.180	45.99	-0.01	0.08
08:10	940.180	45.99	-0.01	0.08
08:30	960.180	46.01	-0.03	0.06
08:50	980.170	46.02	-0.04	0.05
09:10	1000.200	46.02	-0.04	0.05
10:10	1060.400	46.04	-0.06	0.03
11:10	1120.700	46.06	-0.08	0.01
12:10	1180.300	46.09	-0.11	0.02
13:10	1240.300	46.05	-0.07	0.02
14:10	1300.400	46.12	-0.14	0.05
15:10	1360.300	46.07	-0.09	0.00
16:10	1420.200	46.09	-0.11	0.02
17:10	1480.300	46.09	-0.11	0.02
18:10	1540.300	46.06	-0.08	0.01
19:10	1600.300	46.05	-0.07	0.02
20:10	1660.300	46.05	-0.07	0.02
21:10	1720.300	46.05	-0.07	0.02
22:10	1780.300	46.04	-0.06	0.03
23:10	1840.300	46.04	-0.06	0.03

00:10	1900.300	46.04	-0.06	0.03
01:10	1960.300	46.07	-0.09	0.00
02:10	2020.300	46.07	-0.09	0.00
03:10	2080.300	46.05	-0.07	0.02
04:10	2140.300	46.05	-0.07	0.02
05:10	2200.300	46.04	-0.06	0.03
06:10	2260.300	46.04	-0.06	0.03
07:10	2320.300	46.01	-0.03	0.06
08:10	2380.300	46.01	-0.03	0.06
09:10	2440.300	46.03	-0.05	0.04
10:10	2500.300	46.05	-0.07	0.02
11:10	2560.300	46.05	-0.07	0.02
12:10	2620.400	46.11	-0.13	0.04
13:10	2680.400	46.07	-0.09	0.00
14:10	2740.400	46.14	-0.16	0.07
15:10	2800.400	46.12	-0.14	0.05
16:10	2860.400	46.08	-0.10	0.01
17:10	2920.400	46.14	-0.16	0.07
18:10	2980.400	46.10	-0.12	0.03
19:10	3040.200	46.08	-0.10	0.01
20:10	3100.200	46.09	-0.11	0.02
21:10	3160.200	46.11	-0.13	0.04
22:10	3220.200	46.05	-0.07	0.02
23:10	3280.200	46.05	-0.07	0.02
00:10	3340.200	46.09	-0.11	0.02
01:10	3400.200	46.07	-0.09	0.00
02:10	3460.200	46.11	-0.13	0.04
03:10	3520.200	46.12	-0.14	0.05
04:10	3580.300	46.12	-0.14	0.05
05:10	3640.300	46.13	-0.15	0.06
06:10	3700.300	46.11	-0.13	0.04
07:10	3760.300	46.10	-0.12	0.03
07:36	3786.600	46.09	-0.11	0.02

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: P 10-3 INPUT 7
RADIUS: 20.220 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 40.09 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	40.09	0.00
13:00	0.017	-999.99	1040.08
13:00	0.034	-999.99	1040.08
13:00	0.050	-999.99	1040.08
13:00	0.067	-999.99	1040.08
13:00	0.084	-999.99	1040.08
13:00	0.100	-999.99	1040.08
13:00	0.117	-999.99	1040.08
13:00	0.134	-999.99	1040.08
13:00	0.150	-999.99	1040.08
13:00	0.167	-999.99	1040.08
13:00	0.257	40.09	0.00
13:00	0.340	40.09	0.00
13:00	0.424	40.09	0.00
13:00	0.507	40.09	0.00
13:00	0.590	40.10	-0.01
13:00	0.674	40.10	-0.01
13:00	0.757	40.10	-0.01
13:00	0.840	40.10	-0.01
13:00	0.924	40.10	-0.01
13:01	1.007	40.10	-0.01
13:01	1.417	40.10	-0.01
13:01	1.750	40.10	-0.01
13:02	2.084	40.10	-0.01
13:02	2.417	40.10	-0.01
13:02	2.750	40.10	-0.01
13:03	3.084	40.10	-0.01
13:03	3.417	40.10	-0.01
13:03	3.750	40.10	-0.01
13:04	4.084	40.10	-0.01
13:04	4.417	40.10	-0.01
13:04	4.750	40.09	0.00
13:05	5.084	40.09	0.00
13:05	5.417	40.09	0.00
13:05	5.750	40.09	0.00
13:06	6.084	40.09	0.00
13:06	6.417	40.09	0.00
13:06	6.750	40.09	0.00
13:07	7.084	40.09	0.00
13:07	7.417	40.09	0.00

13:07	7.750	40.09	0.00
13:08	8.084	40.09	0.00
13:08	8.417	40.09	0.00
13:08	8.750	40.09	0.00
13:09	9.084	40.09	0.00
13:09	9.417	40.09	0.00
13:09	9.750	40.09	0.00
13:10	10.084	40.09	0.00
13:12	12.101	40.09	0.00
13:14	14.188	40.10	-0.01
13:16	16.139	40.09	0.00
13:18	18.237	40.09	0.00
13:20	20.233	40.09	0.00
13:22	22.233	40.09	0.00
13:24	24.233	40.09	0.00
13:26	26.233	40.09	0.00
13:28	28.233	40.09	0.00
13:30	30.233	40.09	0.00
13:32	32.152	40.09	0.00
13:34	34.620	40.09	0.00
13:36	36.095	40.09	0.00
13:38	38.095	40.09	0.00
13:40	40.095	40.09	0.00
13:42	42.195	40.09	0.00
13:44	44.232	40.09	0.00
13:46	46.232	40.09	0.00
13:48	48.252	40.09	0.00
13:50	50.122	40.09	0.00
13:52	52.122	40.09	0.00
13:54	54.122	40.09	0.00
13:56	56.122	40.09	0.00
13:58	58.122	40.09	0.00
14:00	60.122	40.09	0.00
14:02	62.122	40.09	0.00
14:04	64.122	40.09	0.00
14:06	66.442	40.09	0.00
14:08	68.122	40.10	-0.01
14:10	70.335	40.09	0.00
14:12	72.160	40.09	0.00
14:14	74.160	40.09	0.00
14:16	76.167	40.09	0.00
14:18	78.230	40.09	0.00
14:20	80.217	40.09	0.00
14:22	82.213	40.09	0.00
14:24	84.213	40.09	0.00
14:26	86.213	40.09	0.00
14:28	88.213	40.09	0.00
14:30	90.213	40.09	0.00
14:32	92.213	40.09	0.00
14:34	94.213	40.09	0.00
14:36	96.213	40.09	0.00
14:38	98.238	40.09	0.00
15:00	120.220	40.09	0.00
15:20	140.130	40.09	0.00
15:40	160.130	40.09	0.00
16:00	180.370	40.09	0.00

16:20	200.200	40.09	0.00
16:40	220.200	40.09	0.00
17:00	240.080	40.09	0.00
17:20	260.220	40.09	0.00
17:40	280.150	40.09	0.00
18:00	300.150	40.08	0.01
18:20	320.130	40.08	0.01
18:40	340.220	40.08	0.01
19:00	360.180	40.08	0.01
19:20	380.220	40.08	0.01
19:40	400.220	40.08	0.01
20:00	420.220	40.08	0.01
20:20	440.220	40.08	0.01
20:40	460.220	40.08	0.01
21:00	480.120	40.08	0.01
21:20	500.220	40.08	0.01
21:40	520.320	40.08	0.01
22:00	540.200	40.08	0.01
22:20	560.100	40.08	0.01
22:40	580.100	40.08	0.01
23:00	600.150	40.08	0.01
23:20	620.150	40.07	0.02
23:40	640.180	40.08	0.01
00:00	660.180	40.08	0.01
00:20	680.180	40.07	0.02
00:40	700.180	40.07	0.02
01:00	720.180	40.07	0.02
01:20	740.180	40.07	0.02
01:40	760.180	40.08	0.01
02:00	780.180	40.07	0.02
02:20	800.180	40.07	0.02
02:40	820.180	40.07	0.02
03:00	840.180	40.07	0.02
03:20	860.180	40.07	0.02
03:40	880.180	40.07	0.02
04:00	900.180	40.07	0.02
04:20	920.180	40.07	0.02
04:40	940.180	40.07	0.02
05:00	960.180	40.07	0.02
05:20	980.180	40.07	0.02
05:40	1000.200	40.07	0.02
06:40	1060.400	40.07	0.02
07:40	1120.500	40.07	0.02
08:40	1180.300	40.07	0.02
09:40	1240.300	40.07	0.02
10:40	1300.200	40.07	0.02
11:40	1360.300	40.07	0.02
12:40	1420.300	40.07	0.02
13:40	1480.200	40.08	0.01
14:40	1540.300	40.08	0.01
15:40	1600.300	40.08	0.01
16:30	1650.600	40.08	0.01

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: P 10-3 INPUT 7
RADIUS: 20.220 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 40.09 FEET
WATER STOP LEVEL: 40.08 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1040.07	1040.08
16:30	0.034	-999.99	1040.07	1040.08
16:30	0.050	-999.99	1040.07	1040.08
16:30	0.067	-999.99	1040.07	1040.08
16:30	0.084	-999.99	1040.07	1040.08
16:30	0.100	-999.99	1040.07	1040.08
16:30	0.117	-999.99	1040.07	1040.08
16:30	0.134	-999.99	1040.07	1040.08
16:30	0.150	-999.99	1040.07	1040.08
16:30	0.167	-999.99	1040.07	1040.08
16:30	0.257	40.08	0.00	0.01
16:30	0.340	40.08	0.00	0.01
16:30	0.424	40.08	0.00	0.01
16:30	0.507	40.08	0.00	0.01
16:30	0.591	40.08	0.00	0.01
16:30	0.674	40.08	0.00	0.01
16:30	0.757	40.08	0.00	0.01
16:30	0.840	40.08	0.00	0.01
16:30	0.924	40.08	0.00	0.01
16:31	1.007	40.08	0.00	0.01
16:31	1.417	40.08	0.00	0.01
16:31	1.751	40.08	0.00	0.01
16:32	2.084	40.08	0.00	0.01
16:32	2.417	40.08	0.00	0.01
16:32	2.751	40.08	0.00	0.01
16:33	3.084	40.08	0.00	0.01
16:33	3.417	40.08	0.00	0.01
16:33	3.751	40.08	0.00	0.01
16:34	4.084	40.08	0.00	0.01
16:34	4.417	40.08	0.00	0.01
16:34	4.751	40.08	0.00	0.01
16:35	5.084	40.08	0.00	0.01
16:35	5.417	40.08	0.00	0.01
16:35	5.751	40.08	0.00	0.01
16:36	6.084	40.08	0.00	0.01
16:36	6.417	40.08	0.00	0.01
16:36	6.751	40.08	0.00	0.01
16:37	7.084	40.08	0.00	0.01

16:37	7.417	40.08	0.00	0.01
16:37	7.751	40.08	0.00	0.01
16:38	8.084	40.08	0.00	0.01
16:38	8.417	40.08	0.00	0.01
16:38	8.751	40.08	0.00	0.01
16:39	9.084	40.08	0.00	0.01
16:39	9.417	40.08	0.00	0.01
16:39	9.751	40.08	0.00	0.01
16:40	10.084	40.08	0.00	0.01
16:42	12.120	40.08	0.00	0.01
16:44	14.120	40.08	0.00	0.01
16:46	16.120	40.08	0.00	0.01
16:48	18.120	40.08	0.00	0.01
16:50	20.142	40.08	0.00	0.01
16:52	22.225	40.08	0.00	0.01
16:54	24.225	40.08	0.00	0.01
16:56	26.225	40.08	0.00	0.01
16:58	28.225	40.08	0.00	0.01
17:00	30.225	40.08	0.00	0.01
17:02	32.225	40.08	0.00	0.01
17:04	34.225	40.08	0.00	0.01
17:06	36.225	40.08	0.00	0.01
17:08	38.225	40.08	0.00	0.01
17:10	40.225	40.08	0.00	0.01
17:12	42.225	40.08	0.00	0.01
17:14	44.225	40.08	0.00	0.01
17:16	46.225	40.08	0.00	0.01
17:18	48.225	40.08	0.00	0.01
17:20	50.342	40.08	0.00	0.01
17:22	52.220	40.08	0.00	0.01
17:24	54.222	40.08	0.00	0.01
17:26	56.222	40.08	0.00	0.01
17:28	58.220	40.08	0.00	0.01
17:30	60.120	40.08	0.00	0.01
17:32	62.220	40.08	0.00	0.01
17:34	64.222	40.08	0.00	0.01
17:36	66.220	40.08	0.00	0.01
17:38	68.220	40.08	0.00	0.01
17:40	70.220	40.08	0.00	0.01
17:42	72.220	40.08	0.00	0.01
17:44	74.222	40.08	0.00	0.01
17:46	76.095	40.08	0.00	0.01
17:48	78.180	40.08	0.00	0.01
17:50	80.575	40.08	0.00	0.01
17:52	82.215	40.08	0.00	0.01
17:54	84.215	40.08	0.00	0.01
17:56	86.215	40.08	0.00	0.01
17:58	88.215	40.08	0.00	0.01
18:00	90.493	40.08	0.00	0.01
18:02	92.210	40.08	0.00	0.01
18:04	94.248	40.08	0.00	0.01
18:06	96.248	40.08	0.00	0.01
18:08	98.248	40.08	0.00	0.01
18:30	120.250	40.08	0.00	0.01
18:50	140.250	40.08	0.00	0.01
19:10	160.180	40.08	0.00	0.01

19:30	180.170	40.08	0.00	0.01
19:50	200.220	40.08	0.00	0.01
20:10	220.150	40.08	0.00	0.01
20:30	240.150	40.08	0.00	0.01
20:50	260.150	40.08	0.00	0.01
21:10	280.250	40.08	0.00	0.01
21:30	300.250	40.08	0.00	0.01
21:50	320.250	40.08	0.00	0.01
22:10	340.250	40.08	0.00	0.01
22:30	360.220	40.08	0.00	0.01
22:50	380.080	40.08	0.00	0.01
23:10	400.080	40.09	-0.01	0.00
23:30	420.150	40.09	-0.01	0.00
23:50	440.080	40.09	-0.01	0.00
00:10	460.220	40.09	-0.01	0.00
00:30	480.220	40.09	-0.01	0.00
00:50	500.220	40.09	-0.01	0.00
01:10	520.220	40.09	-0.01	0.00
01:30	540.220	40.09	-0.01	0.00
01:50	560.220	40.09	-0.01	0.00
02:10	580.220	40.09	-0.01	0.00
02:30	600.220	40.09	-0.01	0.00
02:50	620.220	40.09	-0.01	0.00
03:10	640.220	40.09	-0.01	0.00
03:30	660.220	40.09	-0.01	0.00
03:50	680.220	40.09	-0.01	0.00
04:10	700.220	40.09	-0.01	0.00
04:30	720.220	40.09	-0.01	0.00
04:50	740.220	40.09	-0.01	0.00
05:10	760.220	40.09	-0.01	0.00
05:30	780.220	40.09	-0.01	0.00
05:50	800.220	40.09	-0.01	0.00
06:10	820.220	40.09	-0.01	0.00
06:30	840.220	40.09	-0.01	0.00
06:50	860.220	40.09	-0.01	0.00
07:10	880.180	40.09	-0.01	0.00
07:30	900.180	40.09	-0.01	0.00
07:50	920.180	40.09	-0.01	0.00
08:10	940.180	40.09	-0.01	0.00
08:30	960.180	40.09	-0.01	0.00
08:50	980.170	40.09	-0.01	0.00
09:10	1000.200	40.09	-0.01	0.00
10:10	1060.400	40.09	-0.01	0.00
11:10	1120.700	40.10	-0.02	0.01
12:10	1180.300	40.10	-0.02	0.01
13:10	1240.300	40.09	-0.01	0.00
14:10	1300.400	40.10	-0.02	0.01
15:10	1360.300	40.10	-0.02	0.01
16:10	1420.200	40.10	-0.02	0.01
17:10	1480.300	40.10	-0.02	0.01
18:10	1540.300	40.10	-0.02	0.01
19:10	1600.300	40.10	-0.02	0.01
20:10	1660.300	40.10	-0.02	0.01
21:10	1720.300	40.10	-0.02	0.01
22:10	1780.300	40.10	-0.02	0.01
23:10	1840.300	40.10	-0.02	0.01

00:10	1900.300	40.10	-0.02	0.01
01:10	1960.300	40.10	-0.02	0.01
02:10	2020.300	40.10	-0.02	0.01
03:10	2080.300	40.10	-0.02	0.01
04:10	2140.300	40.10	-0.02	0.01
05:10	2200.300	40.10	-0.02	0.01
06:10	2260.300	40.10	-0.02	0.01
07:10	2320.300	40.10	-0.02	0.01
08:10	2380.300	40.10	-0.02	0.01
09:10	2440.300	40.10	-0.02	0.01
10:10	2500.300	40.10	-0.02	0.01
11:10	2560.300	40.10	-0.02	0.01
12:10	2620.400	40.10	-0.02	0.01
13:10	2680.400	40.10	-0.02	0.01
14:10	2740.400	40.09	-0.01	0.00
15:10	2800.400	40.10	-0.02	0.01
16:10	2860.400	40.10	-0.02	0.01
17:10	2920.400	40.10	-0.02	0.01
18:10	2980.400	40.10	-0.02	0.01
19:10	3040.200	40.10	-0.02	0.01
20:10	3100.200	40.10	-0.02	0.01
21:10	3160.200	40.10	-0.02	0.01
22:10	3220.200	40.10	-0.02	0.01
23:10	3280.200	40.10	-0.02	0.01
00:10	3340.200	40.10	-0.02	0.01
01:10	3400.200	40.10	-0.02	0.01
02:10	3460.200	40.10	-0.02	0.01
03:10	3520.200	40.10	-0.02	0.01
04:10	3580.300	40.10	-0.02	0.01
05:10	3640.300	40.10	-0.02	0.01
06:10	3700.300	40.10	-0.02	0.01
07:10	3760.300	40.10	-0.02	0.01
07:36	3786.600	40.10	-0.02	0.01

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: P 10-4 INPUT 8
RADIUS: 20.053 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 38.82 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	38.82	0.00
13:00	0.017	-999.99	1038.81
13:00	0.034	-999.99	1038.81
13:00	0.050	-999.99	1038.81
13:00	0.067	-999.99	1038.81
13:00	0.084	-999.99	1038.81
13:00	0.100	-999.99	1038.81
13:00	0.117	-999.99	1038.81
13:00	0.134	-999.99	1038.81
13:00	0.150	-999.99	1038.81
13:00	0.167	-999.99	1038.81
13:00	0.257	38.82	0.00
13:00	0.340	38.83	-0.01
13:00	0.424	38.83	-0.01
13:00	0.507	38.83	-0.01
13:00	0.590	38.83	-0.01
13:00	0.674	38.83	-0.01
13:00	0.757	38.83	-0.01
13:00	0.840	38.83	-0.01
13:00	0.924	38.83	-0.01
13:01	1.007	38.83	-0.01
13:01	1.417	38.83	-0.01
13:01	1.750	38.83	-0.01
13:02	2.084	38.83	-0.01
13:02	2.417	38.83	-0.01
13:02	2.750	38.83	-0.01
13:03	3.084	38.82	0.00
13:03	3.417	38.83	-0.01
13:03	3.750	38.83	-0.01
13:04	4.084	38.83	-0.01
13:04	4.417	38.83	-0.01
13:04	4.750	38.82	0.00
13:05	5.084	38.82	0.00
13:05	5.417	38.82	0.00
13:05	5.750	38.82	0.00
13:06	6.084	38.82	0.00
13:06	6.417	38.82	0.00
13:06	6.750	38.82	0.00
13:07	7.084	38.82	0.00
13:07	7.417	38.82	0.00

13:07	7.750	38.83	-0.01
13:08	8.084	38.83	-0.01
13:08	8.417	38.83	-0.01
13:08	8.750	38.83	-0.01
13:09	9.084	38.83	-0.01
13:09	9.417	38.83	-0.01
13:09	9.750	38.83	-0.01
13:10	10.084	38.83	-0.01
13:12	12.101	38.83	-0.01
13:14	14.188	38.83	-0.01
13:16	16.139	38.82	0.00
13:18	18.237	38.82	0.00
13:20	20.233	38.82	0.00
13:22	22.233	38.83	-0.01
13:24	24.233	38.83	-0.01
13:26	26.233	38.82	0.00
13:28	28.233	38.82	0.00
13:30	30.233	38.82	0.00
13:32	32.152	38.82	0.00
13:34	34.620	38.83	-0.01
13:36	36.095	38.82	0.00
13:38	38.095	38.82	0.00
13:40	40.095	38.82	0.00
13:42	42.195	38.82	0.00
13:44	44.232	38.82	0.00
13:46	46.232	38.82	0.00
13:48	48.252	38.82	0.00
13:50	50.122	38.82	0.00
13:52	52.122	38.83	-0.01
13:54	54.122	38.83	-0.01
13:56	56.122	38.83	-0.01
13:58	58.122	38.83	-0.01
14:00	60.122	38.82	0.00
14:02	62.122	38.82	0.00
14:04	64.122	38.82	0.00
14:06	66.442	38.82	0.00
14:08	68.122	38.82	0.00
14:10	70.335	38.82	0.00
14:12	72.160	38.82	0.00
14:14	74.160	38.82	0.00
14:16	76.167	38.82	0.00
14:18	78.230	38.82	0.00
14:20	80.217	38.82	0.00
14:22	82.213	38.82	0.00
14:24	84.213	38.82	0.00
14:26	86.213	38.82	0.00
14:28	88.213	38.82	0.00
14:30	90.213	38.82	0.00
14:32	92.213	38.82	0.00
14:34	94.213	38.82	0.00
14:36	96.213	38.82	0.00
14:38	98.238	38.82	0.00
15:00	120.220	38.82	0.00
15:20	140.130	38.82	0.00
15:40	160.130	38.82	0.00
16:00	180.370	38.82	0.00

16:20	200.200	38.82	0.00
16:40	220.200	38.81	0.01
17:00	240.080	38.81	0.01
17:20	260.220	38.81	0.01
17:40	280.150	38.81	0.01
18:00	300.150	38.81	0.01
18:20	320.130	38.81	0.01
18:40	340.220	38.81	0.01
19:00	360.180	38.81	0.01
19:20	380.220	38.81	0.01
19:40	400.220	38.81	0.01
20:00	420.220	38.81	0.01
20:20	440.220	38.80	0.02
20:40	460.220	38.81	0.01
21:00	480.120	38.80	0.02
21:20	500.220	38.80	0.02
21:40	520.320	38.80	0.02
22:00	540.200	38.80	0.02
22:20	560.100	38.80	0.02
22:40	580.100	38.80	0.02
23:00	600.150	38.80	0.02
23:20	620.150	38.81	0.01
23:40	640.180	38.80	0.02
00:00	660.180	38.80	0.02
00:20	680.180	38.80	0.02
00:40	700.180	38.80	0.02
01:00	720.180	38.80	0.02
01:20	740.180	38.80	0.02
01:40	760.180	38.80	0.02
02:00	780.180	38.80	0.02
02:20	800.180	38.80	0.02
02:40	820.180	38.80	0.02
03:00	840.180	38.80	0.02
03:20	860.180	38.80	0.02
03:40	880.180	38.80	0.02
04:00	900.180	38.80	0.02
04:20	920.180	38.80	0.02
04:40	940.180	38.80	0.02
05:00	960.180	38.80	0.02
05:20	980.180	38.80	0.02
05:40	1000.200	38.80	0.02
06:40	1060.400	38.80	0.02
07:40	1120.500	38.80	0.02
08:40	1180.300	38.80	0.02
09:40	1240.300	38.80	0.02
10:40	1300.200	38.81	0.01
11:40	1360.300	38.81	0.01
12:40	1420.300	38.81	0.01
13:40	1480.200	38.81	0.01
14:40	1540.300	38.81	0.01
15:40	1600.300	38.81	0.01
16:30	1650.600	38.81	0.01

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: P 10-4 INPUT 8
RADIUS: 20.053 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 38.82 FEET
WATER STOP LEVEL: 38.81 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1038.80	1038.81
16:30	0.034	-999.99	1038.80	1038.81
16:30	0.050	-999.99	1038.80	1038.81
16:30	0.067	-999.99	1038.80	1038.81
16:30	0.084	-999.99	1038.80	1038.81
16:30	0.100	-999.99	1038.80	1038.81
16:30	0.117	-999.99	1038.80	1038.81
16:30	0.134	-999.99	1038.80	1038.81
16:30	0.150	-999.99	1038.80	1038.81
16:30	0.167	-999.99	1038.80	1038.81
16:30	0.257	38.81	0.00	0.01
16:30	0.340	38.81	0.00	0.01
16:30	0.424	38.81	0.00	0.01
16:30	0.507	38.81	0.00	0.01
16:30	0.591	38.81	0.00	0.01
16:30	0.674	38.81	0.00	0.01
16:30	0.757	38.81	0.00	0.01
16:30	0.840	38.81	0.00	0.01
16:30	0.924	38.81	0.00	0.01
16:31	1.007	38.81	0.00	0.01
16:31	1.417	38.81	0.00	0.01
16:31	1.751	38.81	0.00	0.01
16:32	2.084	38.81	0.00	0.01
16:32	2.417	38.81	0.00	0.01
16:32	2.751	38.81	0.00	0.01
16:33	3.084	38.81	0.00	0.01
16:33	3.417	38.81	0.00	0.01
16:33	3.751	38.81	0.00	0.01
16:34	4.084	38.81	0.00	0.01
16:34	4.417	38.81	0.00	0.01
16:34	4.751	38.81	0.00	0.01
16:35	5.084	38.81	0.00	0.01
16:35	5.417	38.81	0.00	0.01
16:35	5.751	38.81	0.00	0.01
16:36	6.084	38.81	0.00	0.01
16:36	6.417	38.81	0.00	0.01
16:36	6.751	38.81	0.00	0.01
16:37	7.084	38.81	0.00	0.01

16:37	7.417	38.81	0.00	0.01
16:37	7.751	38.81	0.00	0.01
16:38	8.084	38.81	0.00	0.01
16:38	8.417	38.81	0.00	0.01
16:38	8.751	38.81	0.00	0.01
16:39	9.084	38.81	0.00	0.01
16:39	9.417	38.81	0.00	0.01
16:39	9.751	38.81	0.00	0.01
16:40	10.084	38.81	0.00	0.01
16:42	12.120	38.81	0.00	0.01
16:44	14.120	38.80	0.01	0.02
16:46	16.120	38.80	0.01	0.02
16:48	18.120	38.81	0.00	0.01
16:50	20.142	38.81	0.00	0.01
16:52	22.225	38.81	0.00	0.01
16:54	24.225	38.81	0.00	0.01
16:56	26.225	38.81	0.00	0.01
16:58	28.225	38.81	0.00	0.01
17:00	30.225	38.81	0.00	0.01
17:02	32.225	38.81	0.00	0.01
17:04	34.225	38.81	0.00	0.01
17:06	36.225	38.81	0.00	0.01
17:08	38.225	38.81	0.00	0.01
17:10	40.225	38.81	0.00	0.01
17:12	42.225	38.81	0.00	0.01
17:14	44.225	38.81	0.00	0.01
17:16	46.225	38.81	0.00	0.01
17:18	48.225	38.81	0.00	0.01
17:20	50.342	38.81	0.00	0.01
17:22	52.220	38.81	0.00	0.01
17:24	54.222	38.81	0.00	0.01
17:26	56.222	38.81	0.00	0.01
17:28	58.220	38.81	0.00	0.01
17:30	60.120	38.81	0.00	0.01
17:32	62.220	38.81	0.00	0.01
17:34	64.222	38.81	0.00	0.01
17:36	66.220	38.81	0.00	0.01
17:38	68.220	38.81	0.00	0.01
17:40	70.220	38.81	0.00	0.01
17:42	72.220	38.81	0.00	0.01
17:44	74.222	38.81	0.00	0.01
17:46	76.095	38.81	0.00	0.01
17:48	78.180	38.81	0.00	0.01
17:50	80.575	38.81	0.00	0.01
17:52	82.215	38.81	0.00	0.01
17:54	84.215	38.81	0.00	0.01
17:56	86.215	38.81	0.00	0.01
17:58	88.215	38.81	0.00	0.01
18:00	90.493	38.81	0.00	0.01
18:02	92.210	38.81	0.00	0.01
18:04	94.248	38.81	0.00	0.01
18:06	96.248	38.81	0.00	0.01
18:08	98.248	38.81	0.00	0.01
18:30	120.250	38.81	0.00	0.01
18:50	140.250	38.81	0.00	0.01
19:10	160.180	38.81	0.00	0.01

19:30	180.170	38.81	0.00	0.01
19:50	200.220	38.81	0.00	0.01
20:10	220.150	38.81	0.00	0.01
20:30	240.150	38.81	0.00	0.01
20:50	260.150	38.81	0.00	0.01
21:10	280.250	38.81	0.00	0.01
21:30	300.250	38.81	0.00	0.01
21:50	320.250	38.81	0.00	0.01
22:10	340.250	38.81	0.00	0.01
22:30	360.220	38.81	0.00	0.01
22:50	380.080	38.81	0.00	0.01
23:10	400.080	38.81	0.00	0.01
23:30	420.150	38.81	0.00	0.01
23:50	440.080	38.81	0.00	0.01
00:10	460.220	38.81	0.00	0.01
00:30	480.220	38.81	0.00	0.01
00:50	500.220	38.81	0.00	0.01
01:10	520.220	38.81	0.00	0.01
01:30	540.220	38.81	0.00	0.01
01:50	560.220	38.81	0.00	0.01
02:10	580.220	38.82	-0.01	0.00
02:30	600.220	38.81	0.00	0.01
02:50	620.220	38.81	0.00	0.01
03:10	640.220	38.82	-0.01	0.00
03:30	660.220	38.82	-0.01	0.00
03:50	680.220	38.82	-0.01	0.00
04:10	700.220	38.82	-0.01	0.00
04:30	720.220	38.82	-0.01	0.00
04:50	740.220	38.82	-0.01	0.00
05:10	760.220	38.82	-0.01	0.00
05:30	780.220	38.82	-0.01	0.00
05:50	800.220	38.82	-0.01	0.00
06:10	820.220	38.82	-0.01	0.00
06:30	840.220	38.82	-0.01	0.00
06:50	860.220	38.82	-0.01	0.00
07:10	880.180	38.82	-0.01	0.00
07:30	900.180	38.82	-0.01	0.00
07:50	920.180	38.82	-0.01	0.00
08:10	940.180	38.82	-0.01	0.00
08:30	960.180	38.82	-0.01	0.00
08:50	980.170	38.82	-0.01	0.00
09:10	1000.200	38.82	-0.01	0.00
10:10	1060.400	38.82	-0.01	0.00
11:10	1120.700	38.82	-0.01	0.00
12:10	1180.300	38.82	-0.01	0.00
13:10	1240.300	38.82	-0.01	0.00
14:10	1300.400	38.82	-0.01	0.00
15:10	1360.300	38.82	-0.01	0.00
16:10	1420.200	38.82	-0.01	0.00
17:10	1480.300	38.83	-0.02	0.01
18:10	1540.300	38.82	-0.01	0.00
19:10	1600.300	38.83	-0.02	0.01
20:10	1660.300	38.82	-0.01	0.00
21:10	1720.300	38.83	-0.02	0.01
22:10	1780.300	38.83	-0.02	0.01
23:10	1840.300	38.83	-0.02	0.01

00:10	1900.300	38.83	-0.02	0.01
01:10	1960.300	38.83	-0.02	0.01
02:10	2020.300	38.83	-0.02	0.01
03:10	2080.300	38.83	-0.02	0.01
04:10	2140.300	38.83	-0.02	0.01
05:10	2200.300	38.83	-0.02	0.01
06:10	2260.300	38.83	-0.02	0.01
07:10	2320.300	38.83	-0.02	0.01
08:10	2380.300	38.83	-0.02	0.01
09:10	2440.300	38.84	-0.03	0.02
10:10	2500.300	38.84	-0.03	0.02
11:10	2560.300	38.84	-0.03	0.02
12:10	2620.400	38.84	-0.03	0.02
13:10	2680.400	38.84	-0.03	0.02
14:10	2740.400	38.85	-0.04	0.03
15:10	2800.400	38.84	-0.03	0.02
16:10	2860.400	38.84	-0.03	0.02
17:10	2920.400	38.84	-0.03	0.02
18:10	2980.400	38.84	-0.03	0.02
19:10	3040.200	38.84	-0.03	0.02
20:10	3100.200	38.84	-0.03	0.02
21:10	3160.200	38.84	-0.03	0.02
22:10	3220.200	38.84	-0.03	0.02
23:10	3280.200	38.85	-0.04	0.03
00:10	3340.200	38.85	-0.04	0.03
01:10	3400.200	38.85	-0.04	0.03
02:10	3460.200	38.85	-0.04	0.03
03:10	3520.200	38.85	-0.04	0.03
04:10	3580.300	38.85	-0.04	0.03
05:10	3640.300	38.85	-0.04	0.03
06:10	3700.300	38.85	-0.04	0.03
07:10	3760.300	38.85	-0.04	0.03
07:36	3786.600	38.85	-0.04	0.03

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 10-2 INPUT 9
RADIUS: 25.391 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 5.66 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	5.66	0.00
13:00	0.017	-999.99	1005.65
13:00	0.034	-999.99	1005.65
13:00	0.050	-999.99	1005.65
13:00	0.067	-999.99	1005.65
13:00	0.084	-999.99	1005.65
13:00	0.100	-999.99	1005.65
13:00	0.117	-999.99	1005.65
13:00	0.134	-999.99	1005.65
13:00	0.150	-999.99	1005.65
13:00	0.167	-999.99	1005.65
13:00	0.257	5.67	-0.01
13:00	0.340	5.67	-0.01
13:00	0.424	5.67	-0.01
13:00	0.507	5.67	-0.01
13:00	0.590	5.67	-0.01
13:00	0.674	5.67	-0.01
13:00	0.757	5.67	-0.01
13:00	0.840	5.67	-0.01
13:00	0.924	5.68	-0.02
13:01	1.007	5.68	-0.02
13:01	1.417	5.69	-0.03
13:01	1.750	5.70	-0.04
13:02	2.084	5.71	-0.05
13:02	2.417	5.71	-0.05
13:02	2.750	5.72	-0.06
13:03	3.084	5.71	-0.05
13:03	3.417	5.70	-0.04
13:03	3.750	5.70	-0.04
13:04	4.084	5.70	-0.04
13:04	4.417	5.69	-0.03
13:04	4.750	5.69	-0.03
13:05	5.084	5.68	-0.02
13:05	5.417	5.67	-0.01
13:05	5.750	5.67	-0.01
13:06	6.084	5.66	0.00
13:06	6.417	5.66	0.00
13:06	6.750	5.65	0.01
13:07	7.084	5.65	0.01
13:07	7.417	5.65	0.01

13:07	7.750	5.65	0.01
13:08	8.084	5.65	0.01
13:08	8.417	5.65	0.01
13:08	8.750	5.66	0.00
13:09	9.084	5.66	0.00
13:09	9.417	5.66	0.00
13:09	9.750	5.66	0.00
13:10	10.084	5.66	0.00
13:12	12.101	5.66	0.00
13:14	14.188	5.67	-0.01
13:16	16.139	5.67	-0.01
13:18	18.237	5.65	0.01
13:20	20.233	5.64	0.02
13:22	22.233	5.64	0.02
13:24	24.233	5.64	0.02
13:26	26.233	5.65	0.01
13:28	28.233	5.64	0.02
13:30	30.233	5.64	0.02
13:32	32.152	5.64	0.02
13:34	34.620	5.64	0.02
13:36	36.095	5.64	0.02
13:38	38.095	5.64	0.02
13:40	40.095	5.64	0.02
13:42	42.195	5.63	0.03
13:44	44.232	5.62	0.04
13:46	46.232	5.61	0.05
13:48	48.252	5.63	0.03
13:50	50.122	5.63	0.03
13:52	52.122	5.64	0.02
13:54	54.122	5.64	0.02
13:56	56.122	5.63	0.03
13:58	58.122	5.65	0.01
14:00	60.122	5.64	0.02
14:02	62.122	5.62	0.04
14:04	64.122	5.63	0.03
14:06	66.442	5.63	0.03
14:08	68.122	5.64	0.02
14:10	70.335	5.64	0.02
14:12	72.160	5.65	0.01
14:14	74.160	5.64	0.02
14:16	76.167	5.63	0.03
14:18	78.230	5.63	0.03
14:20	80.217	5.63	0.03
14:22	82.213	5.63	0.03
14:24	84.213	5.62	0.04
14:26	86.213	5.62	0.04
14:28	88.213	5.62	0.04
14:30	90.213	5.62	0.04
14:32	92.213	5.62	0.04
14:34	94.213	5.61	0.05
14:36	96.213	5.61	0.05
14:38	98.238	5.61	0.05
15:00	120.220	5.61	0.05
15:20	140.130	5.59	0.07
15:40	160.130	5.58	0.08
16:00	180.370	5.58	0.08

16:20	200.200	5.58	0.08
16:40	220.200	5.57	0.09
17:00	240.080	5.56	0.10
17:20	260.220	5.56	0.10
17:40	280.150	5.56	0.10
18:00	300.150	5.55	0.11
18:20	320.130	5.55	0.11
18:40	340.220	5.55	0.11
19:00	360.180	5.55	0.11
19:20	380.220	5.54	0.12
19:40	400.220	5.55	0.11
20:00	420.220	5.54	0.12
20:20	440.220	5.54	0.12
20:40	460.220	5.54	0.12
21:00	480.120	5.54	0.12
21:20	500.220	5.54	0.12
21:40	520.320	5.54	0.12
22:00	540.200	5.55	0.11
22:20	560.100	5.54	0.12
22:40	580.100	5.54	0.12
23:00	600.150	5.54	0.12
23:20	620.150	5.53	0.13
23:40	640.180	5.53	0.13
00:00	660.180	5.53	0.13
00:20	680.180	5.53	0.13
00:40	700.180	5.53	0.13
01:00	720.180	5.53	0.13
01:20	740.180	5.53	0.13
01:40	760.180	5.53	0.13
02:00	780.180	5.53	0.13
02:20	800.180	5.52	0.14
02:40	820.180	5.52	0.14
03:00	840.180	5.52	0.14
03:20	860.180	5.51	0.15
03:40	880.180	5.50	0.16
04:00	900.180	5.50	0.16
04:20	920.180	5.50	0.16
04:40	940.180	5.50	0.16
05:00	960.180	5.49	0.17
05:20	980.180	5.49	0.17
05:40	1000.200	5.49	0.17
06:40	1060.400	5.49	0.17
07:40	1120.500	5.49	0.17
08:40	1180.300	5.50	0.16
09:40	1240.300	5.49	0.17
10:40	1300.200	5.50	0.16
11:40	1360.300	5.51	0.15
12:40	1420.300	5.49	0.17
13:40	1480.200	5.48	0.18
14:40	1540.300	5.44	0.22
15:40	1600.300	5.42	0.24
16:30	1650.600	5.41	0.25

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-2 INPUT 9
RADIUS: 25.391 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 5.66 FEET
WATER STOP LEVEL: 5.41 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1005.40	1005.65
16:30	0.034	-999.99	1005.40	1005.65
16:30	0.050	-999.99	1005.40	1005.65
16:30	0.067	-999.99	1005.40	1005.65
16:30	0.084	-999.99	1005.40	1005.65
16:30	0.100	-999.99	1005.40	1005.65
16:30	0.117	-999.99	1005.40	1005.65
16:30	0.134	-999.99	1005.40	1005.65
16:30	0.150	-999.99	1005.40	1005.65
16:30	0.167	-999.99	1005.40	1005.65
16:30	0.257	5.41	0.00	0.25
16:30	0.340	5.41	0.00	0.25
16:30	0.424	5.41	0.00	0.25
16:30	0.507	5.41	0.00	0.25
16:30	0.591	5.41	0.00	0.25
16:30	0.674	5.41	0.00	0.25
16:30	0.757	5.41	0.00	0.25
16:30	0.840	5.41	0.00	0.25
16:30	0.924	5.41	0.00	0.25
16:31	1.007	5.40	0.01	0.26
16:31	1.417	5.40	0.01	0.26
16:31	1.751	5.40	0.01	0.26
16:32	2.084	5.40	0.01	0.26
16:32	2.417	5.40	0.01	0.26
16:32	2.751	5.40	0.01	0.26
16:33	3.084	5.40	0.01	0.26
16:33	3.417	5.40	0.01	0.26
16:33	3.751	5.40	0.01	0.26
16:34	4.084	5.41	0.00	0.25
16:34	4.417	5.41	0.00	0.25
16:34	4.751	5.41	0.00	0.25
16:35	5.084	5.41	0.00	0.25
16:35	5.417	5.41	0.00	0.25
16:35	5.751	5.41	0.00	0.25
16:36	6.084	5.41	0.00	0.25
16:36	6.417	5.41	0.00	0.25
16:36	6.751	5.42	-0.01	0.24
16:37	7.084	5.42	-0.01	0.24

16:37	7.417	5.42	-0.01	0.24
16:37	7.751	5.42	-0.01	0.24
16:38	8.084	5.42	-0.01	0.24
16:38	8.417	5.42	-0.01	0.24
16:38	8.751	5.42	-0.01	0.24
16:39	9.084	5.42	-0.01	0.24
16:39	9.417	5.42	-0.01	0.24
16:39	9.751	5.42	-0.01	0.24
16:40	10.084	5.42	-0.01	0.24
16:42	12.120	5.41	0.00	0.25
16:44	14.120	5.40	0.01	0.26
16:46	16.120	5.39	0.02	0.27
16:48	18.120	5.39	0.02	0.27
16:50	20.142	5.39	0.02	0.27
16:52	22.225	5.40	0.01	0.26
16:54	24.225	5.40	0.01	0.26
16:56	26.225	5.40	0.01	0.26
16:58	28.225	5.40	0.01	0.26
17:00	30.225	5.40	0.01	0.26
17:02	32.225	5.40	0.01	0.26
17:04	34.225	5.40	0.01	0.26
17:06	36.225	5.40	0.01	0.26
17:08	38.225	5.40	0.01	0.26
17:10	40.225	5.40	0.01	0.26
17:12	42.225	5.40	0.01	0.26
17:14	44.225	5.40	0.01	0.26
17:16	46.225	5.40	0.01	0.26
17:18	48.225	5.39	0.02	0.27
17:20	50.342	5.40	0.01	0.26
17:22	52.220	5.40	0.01	0.26
17:24	54.222	5.39	0.02	0.27
17:26	56.222	5.39	0.02	0.27
17:28	58.220	5.39	0.02	0.27
17:30	60.120	5.39	0.02	0.27
17:32	62.220	5.39	0.02	0.27
17:34	64.222	5.39	0.02	0.27
17:36	66.220	5.39	0.02	0.27
17:38	68.220	5.40	0.01	0.26
17:40	70.220	5.39	0.02	0.27
17:42	72.220	5.40	0.01	0.26
17:44	74.222	5.40	0.01	0.26
17:46	76.095	5.40	0.01	0.26
17:48	78.180	5.40	0.01	0.26
17:50	80.575	5.40	0.01	0.26
17:52	82.215	5.39	0.02	0.27
17:54	84.215	5.39	0.02	0.27
17:56	86.215	5.39	0.02	0.27
17:58	88.215	5.39	0.02	0.27
18:00	90.493	5.39	0.02	0.27
18:02	92.210	5.39	0.02	0.27
18:04	94.248	5.39	0.02	0.27
18:06	96.248	5.39	0.02	0.27
18:08	98.248	5.39	0.02	0.27
18:30	120.250	5.39	0.02	0.27
18:50	140.250	5.39	0.02	0.27
19:10	160.180	5.38	0.03	0.28

19:30	180.170	5.39	0.02	0.27
19:50	200.220	5.39	0.02	0.27
20:10	220.150	5.39	0.02	0.27
20:30	240.150	5.40	0.01	0.26
20:50	260.150	5.41	0.00	0.25
21:10	280.250	5.42	-0.01	0.24
21:30	300.250	5.42	-0.01	0.24
21:50	320.250	5.42	-0.01	0.24
22:10	340.250	5.42	-0.01	0.24
22:30	360.220	5.43	-0.02	0.23
22:50	380.080	5.43	-0.02	0.23
23:10	400.080	5.42	-0.01	0.24
23:30	420.150	5.42	-0.01	0.24
23:50	440.080	5.42	-0.01	0.24
00:10	460.220	5.41	0.00	0.25
00:30	480.220	5.41	0.00	0.25
00:50	500.220	5.41	0.00	0.25
01:10	520.220	5.41	0.00	0.25
01:30	540.220	5.40	0.01	0.26
01:50	560.220	5.40	0.01	0.26
02:10	580.220	5.40	0.01	0.26
02:30	600.220	5.40	0.01	0.26
02:50	620.220	5.39	0.02	0.27
03:10	640.220	5.39	0.02	0.27
03:30	660.220	5.39	0.02	0.27
03:50	680.220	5.38	0.03	0.28
04:10	700.220	5.38	0.03	0.28
04:30	720.220	5.38	0.03	0.28
04:50	740.220	5.37	0.04	0.29
05:10	760.220	5.37	0.04	0.29
05:30	780.220	5.37	0.04	0.29
05:50	800.220	5.37	0.04	0.29
06:10	820.220	5.37	0.04	0.29
06:30	840.220	5.37	0.04	0.29
06:50	860.220	5.37	0.04	0.29
07:10	880.180	5.37	0.04	0.29
07:30	900.180	5.37	0.04	0.29
07:50	920.180	5.38	0.03	0.28
08:10	940.180	5.38	0.03	0.28
08:30	960.180	5.39	0.02	0.27
08:50	980.170	5.39	0.02	0.27
09:10	1000.200	5.39	0.02	0.27
10:10	1060.400	5.39	0.02	0.27
11:10	1120.700	5.40	0.01	0.26
12:10	1180.300	5.39	0.02	0.27
13:10	1240.300	5.34	0.07	0.32
14:10	1300.400	5.36	0.05	0.30
15:10	1360.300	5.32	0.09	0.34
16:10	1420.200	5.31	0.10	0.35
17:10	1480.300	5.29	0.12	0.37
18:10	1540.300	5.29	0.12	0.37
19:10	1600.300	5.29	0.12	0.37
20:10	1660.300	5.30	0.11	0.36
21:10	1720.300	5.31	0.10	0.35
22:10	1780.300	5.32	0.09	0.34
23:10	1840.300	5.33	0.08	0.33

00:10	1900.300	5.34	0.07	0.32
01:10	1960.300	5.34	0.07	0.32
02:10	2020.300	5.34	0.07	0.32
03:10	2080.300	5.33	0.08	0.33
04:10	2140.300	5.33	0.08	0.33
05:10	2200.300	5.32	0.09	0.34
06:10	2260.300	5.32	0.09	0.34
07:10	2320.300	5.32	0.09	0.34
08:10	2380.300	5.33	0.08	0.33
09:10	2440.300	5.33	0.08	0.33
10:10	2500.300	5.34	0.07	0.32
11:10	2560.300	5.33	0.08	0.33
12:10	2620.400	5.33	0.08	0.33
13:10	2680.400	5.31	0.10	0.35
14:10	2740.400	5.32	0.09	0.34
15:10	2800.400	5.27	0.14	0.39
16:10	2860.400	5.25	0.16	0.41
17:10	2920.400	5.26	0.15	0.40
18:10	2980.400	5.25	0.16	0.41
19:10	3040.200	5.25	0.16	0.41
20:10	3100.200	5.26	0.15	0.40
21:10	3160.200	5.27	0.14	0.39
22:10	3220.200	5.27	0.14	0.39
23:10	3280.200	5.29	0.12	0.37
00:10	3340.200	5.31	0.10	0.35
01:10	3400.200	5.32	0.09	0.34
02:10	3460.200	5.32	0.09	0.34
03:10	3520.200	5.31	0.10	0.35
04:10	3580.300	5.30	0.11	0.36
05:10	3640.300	5.29	0.12	0.37
06:10	3700.300	5.29	0.12	0.37
07:10	3760.300	5.28	0.13	0.38
07:36	3786.600	5.28	0.13	0.38

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 7.03 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	7.03	0.00
13:00	0.017	-999.99	1007.02
13:00	0.034	-999.99	1007.02
13:00	0.050	-999.99	1007.02
13:00	0.067	-999.99	1007.02
13:00	0.084	-999.99	1007.02
13:00	0.100	-999.99	1007.02
13:00	0.117	-999.99	1007.02
13:00	0.134	-999.99	1007.02
13:00	0.150	-999.99	1007.02
13:00	0.167	-999.99	1007.02
13:00	0.257	7.06	-0.03
13:00	0.340	7.06	-0.03
13:00	0.424	7.07	-0.04
13:00	0.507	7.07	-0.04
13:00	0.590	7.08	-0.05
13:00	0.674	7.09	-0.06
13:00	0.757	7.09	-0.06
13:00	0.840	7.10	-0.07
13:00	0.924	7.11	-0.08
13:01	1.007	7.11	-0.08
13:01	1.417	7.13	-0.10
13:01	1.750	7.14	-0.11
13:02	2.084	7.15	-0.12
13:02	2.417	7.15	-0.12
13:02	2.750	7.15	-0.12
13:03	3.084	7.12	-0.09
13:03	3.417	7.10	-0.07
13:03	3.750	7.11	-0.08
13:04	4.084	7.11	-0.08
13:04	4.417	7.09	-0.06
13:04	4.750	7.07	-0.04
13:05	5.084	7.06	-0.03
13:05	5.417	7.05	-0.02
13:05	5.750	7.04	-0.01
13:06	6.084	7.04	-0.01
13:06	6.417	7.04	-0.01
13:06	6.750	7.04	-0.01
13:07	7.084	7.04	-0.01
13:07	7.417	7.04	-0.01

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 7.03 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	7.03	0.00
13:00	0.017	-999.99	1007.02
13:00	0.034	-999.99	1007.02
13:00	0.050	-999.99	1007.02
13:00	0.067	-999.99	1007.02
13:00	0.084	-999.99	1007.02
13:00	0.100	-999.99	1007.02
13:00	0.117	-999.99	1007.02
13:00	0.134	-999.99	1007.02
13:00	0.150	-999.99	1007.02
13:00	0.167	-999.99	1007.02
13:00	0.257	7.06	-0.03
13:00	0.340	7.06	-0.03
13:00	0.424	7.07	-0.04
13:00	0.507	7.07	-0.04
13:00	0.590	7.08	-0.05
13:00	0.674	7.09	-0.06
13:00	0.757	7.09	-0.06
13:00	0.840	7.10	-0.07
13:00	0.924	7.11	-0.08
13:01	1.007	7.11	-0.08
13:01	1.417	7.13	-0.10
13:01	1.750	7.14	-0.11
13:02	2.084	7.15	-0.12
13:02	2.417	7.15	-0.12
13:02	2.750	7.15	-0.12
13:03	3.084	7.12	-0.09
13:03	3.417	7.10	-0.07
13:03	3.750	7.11	-0.08
13:04	4.084	7.11	-0.08
13:04	4.417	7.09	-0.06
13:04	4.750	7.07	-0.04
13:05	5.084	7.06	-0.03
13:05	5.417	7.05	-0.02
13:05	5.750	7.04	-0.01
13:06	6.084	7.04	-0.01
13:06	6.417	7.04	-0.01
13:06	6.750	7.04	-0.01
13:07	7.084	7.04	-0.01
13:07	7.417	7.04	-0.01

13:07	7.750	7.04	-0.01
13:08	8.084	7.05	-0.02
13:08	8.417	7.05	-0.02
13:08	8.750	7.05	-0.02
13:09	9.084	7.05	-0.02
13:09	9.417	7.06	-0.03
13:09	9.750	7.06	-0.03
13:10	10.084	7.06	-0.03
13:12	12.101	7.06	-0.03
13:14	14.188	7.11	-0.08
13:16	16.139	7.06	-0.03
13:18	18.237	7.04	-0.01
13:20	20.233	7.04	-0.01
13:22	22.233	7.05	-0.02
13:24	24.233	7.06	-0.03
13:26	26.233	7.06	-0.03
13:28	28.233	7.06	-0.03
13:30	30.233	7.06	-0.03
13:32	32.152	7.06	-0.03
13:34	34.620	7.07	-0.04
13:36	36.095	7.06	-0.03
13:38	38.095	7.07	-0.04
13:40	40.095	7.07	-0.04
13:42	42.195	7.04	-0.01
13:44	44.232	7.04	-0.01
13:46	46.232	7.05	-0.02
13:48	48.252	7.06	-0.03
13:50	50.122	7.07	-0.04
13:52	52.122	7.11	-0.08
13:54	54.122	7.09	-0.06
13:56	56.122	7.08	-0.05
13:58	58.122	7.09	-0.06
14:00	60.122	7.06	-0.03
14:02	62.122	7.04	-0.01
14:04	64.122	7.05	-0.02
14:06	66.442	7.06	-0.03
14:08	68.122	7.09	-0.06
14:10	70.335	7.10	-0.07
14:12	72.160	7.09	-0.06
14:14	74.160	7.08	-0.05
14:16	76.167	7.07	-0.04
14:18	78.230	7.07	-0.04
14:20	80.217	7.06	-0.03
14:22	82.213	7.06	-0.03
14:24	84.213	7.06	-0.03
14:26	86.213	7.06	-0.03
14:28	88.213	7.06	-0.03
14:30	90.213	7.06	-0.03
14:32	92.213	7.06	-0.03
14:34	94.213	7.05	-0.02
14:36	96.213	7.05	-0.02
14:38	98.238	7.04	-0.01
15:00	120.220	7.05	-0.02
15:20	140.130	7.05	-0.02
15:40	160.130	7.04	-0.01
16:00	180.370	7.04	-0.01

16:20	200.200	7.03	0.00
16:40	220.200	7.04	-0.01
17:00	240.080	7.03	0.00
17:20	260.220	7.03	0.00
17:40	280.150	7.03	0.00
18:00	300.150	7.04	-0.01
18:20	320.130	7.04	-0.01
18:40	340.220	7.04	-0.01
19:00	360.180	7.04	-0.01
19:20	380.220	7.04	-0.01
19:40	400.220	7.05	-0.02
20:00	420.220	7.05	-0.02
20:20	440.220	7.05	-0.02
20:40	460.220	7.06	-0.03
21:00	480.120	7.07	-0.04
21:20	500.220	7.08	-0.05
21:40	520.320	7.08	-0.05
22:00	540.200	7.08	-0.05
22:20	560.100	7.09	-0.06
22:40	580.100	7.08	-0.05
23:00	600.150	7.09	-0.06
23:20	620.150	7.10	-0.07
23:40	640.180	7.09	-0.06
00:00	660.180	7.09	-0.06
00:20	680.180	7.09	-0.06
00:40	700.180	7.09	-0.06
01:00	720.180	7.09	-0.06
01:20	740.180	7.09	-0.06
01:40	760.180	7.09	-0.06
02:00	780.180	7.10	-0.07
02:20	800.180	7.09	-0.06
02:40	820.180	7.08	-0.05
03:00	840.180	7.08	-0.05
03:20	860.180	7.08	-0.05
03:40	880.180	7.08	-0.05
04:00	900.180	7.08	-0.05
04:20	920.180	7.08	-0.05
04:40	940.180	7.08	-0.05
05:00	960.180	7.08	-0.05
05:20	980.180	7.08	-0.05
05:40	1000.200	7.08	-0.05
06:40	1060.400	7.08	-0.05
07:40	1120.500	7.10	-0.07
08:40	1180.300	7.11	-0.08
09:40	1240.300	7.10	-0.07
10:40	1300.200	7.13	-0.10
11:40	1360.300	7.15	-0.12
12:40	1420.300	7.12	-0.09
13:40	1480.200	7.13	-0.10
14:40	1540.300	7.08	-0.05
15:40	1600.300	7.06	-0.03
16:30	1650.600	7.06	-0.03

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 7.03 FEET
WATER STOP LEVEL: 7.06 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1007.05	1007.02
16:30	0.034	-999.99	1007.05	1007.02
16:30	0.050	-999.99	1007.05	1007.02
16:30	0.067	-999.99	1007.05	1007.02
16:30	0.084	-999.99	1007.05	1007.02
16:30	0.100	-999.99	1007.05	1007.02
16:30	0.117	-999.99	1007.05	1007.02
16:30	0.134	-999.99	1007.05	1007.02
16:30	0.150	-999.99	1007.05	1007.02
16:30	0.167	-999.99	1007.05	1007.02
16:30	0.257	7.06	0.00	0.03
16:30	0.340	7.06	0.00	0.03
16:30	0.424	7.06	0.00	0.03
16:30	0.507	7.06	0.00	0.03
16:30	0.591	7.06	0.00	0.03
16:30	0.674	7.06	0.00	0.03
16:30	0.757	7.06	0.00	0.03
16:30	0.840	7.06	0.00	0.03
16:30	0.924	7.06	0.00	0.03
16:31	1.007	7.06	0.00	0.03
16:31	1.417	7.06	0.00	0.03
16:31	1.751	7.06	0.00	0.03
16:32	2.084	7.06	0.00	0.03
16:32	2.417	7.06	0.00	0.03
16:32	2.751	7.06	0.00	0.03
16:33	3.084	7.06	0.00	0.03
16:33	3.417	7.06	0.00	0.03
16:33	3.751	7.06	0.00	0.03
16:34	4.084	7.07	-0.01	0.04
16:34	4.417	7.07	-0.01	0.04
16:34	4.751	7.06	0.00	0.03
16:35	5.084	7.07	-0.01	0.04
16:35	5.417	7.07	-0.01	0.04
16:35	5.751	7.08	-0.02	0.05
16:36	6.084	7.09	-0.03	0.06
16:36	6.417	7.09	-0.03	0.06
16:36	6.751	7.10	-0.04	0.07
16:37	7.084	7.10	-0.04	0.07

16:37	7.417	7.10	-0.04	0.07
16:37	7.751	7.10	-0.04	0.07
16:38	8.084	7.10	-0.04	0.07
16:38	8.417	7.09	-0.03	0.06
16:38	8.751	7.09	-0.03	0.06
16:39	9.084	7.09	-0.03	0.06
16:39	9.417	7.09	-0.03	0.06
16:39	9.751	7.10	-0.04	0.07
16:40	10.084	7.09	-0.03	0.06
16:42	12.120	7.08	-0.02	0.05
16:44	14.120	7.05	0.01	0.02
16:46	16.120	7.04	0.02	0.01
16:48	18.120	7.04	0.02	0.01
16:50	20.142	7.05	0.01	0.02
16:52	22.225	7.05	0.01	0.02
16:54	24.225	7.05	0.01	0.02
16:56	26.225	7.05	0.01	0.02
16:58	28.225	7.05	0.01	0.02
17:00	30.225	7.05	0.01	0.02
17:02	32.225	7.05	0.01	0.02
17:04	34.225	7.05	0.01	0.02
17:06	36.225	7.05	0.01	0.02
17:08	38.225	7.05	0.01	0.02
17:10	40.225	7.05	0.01	0.02
17:12	42.225	7.05	0.01	0.02
17:14	44.225	7.05	0.01	0.02
17:16	46.225	7.05	0.01	0.02
17:18	48.225	7.05	0.01	0.02
17:20	50.342	7.05	0.01	0.02
17:22	52.220	7.05	0.01	0.02
17:24	54.222	7.05	0.01	0.02
17:26	56.222	7.05	0.01	0.02
17:28	58.220	7.05	0.01	0.02
17:30	60.120	7.05	0.01	0.02
17:32	62.220	7.05	0.01	0.02
17:34	64.222	7.05	0.01	0.02
17:36	66.220	7.05	0.01	0.02
17:38	68.220	7.06	0.00	0.03
17:40	70.220	7.06	0.00	0.03
17:42	72.220	7.06	0.00	0.03
17:44	74.222	7.06	0.00	0.03
17:46	76.095	7.06	0.00	0.03
17:48	78.180	7.06	0.00	0.03
17:50	80.575	7.06	0.00	0.03
17:52	82.215	7.06	0.00	0.03
17:54	84.215	7.06	0.00	0.03
17:56	86.215	7.06	0.00	0.03
17:58	88.215	7.06	0.00	0.03
18:00	90.493	7.06	0.00	0.03
18:02	92.210	7.06	0.00	0.03
18:04	94.248	7.06	0.00	0.03
18:06	96.248	7.06	0.00	0.03
18:08	98.248	7.06	0.00	0.03
18:30	120.250	7.06	0.00	0.03
18:50	140.250	7.06	0.00	0.03
19:10	160.180	7.06	0.00	0.03

19:30	180.170	7.06	0.00	0.03
19:50	200.220	7.07	-0.01	0.04
20:10	220.150	7.08	-0.02	0.05
20:30	240.150	7.08	-0.02	0.05
20:50	260.150	7.09	-0.03	0.06
21:10	280.250	7.11	-0.05	0.08
21:30	300.250	7.11	-0.05	0.08
21:50	320.250	7.11	-0.05	0.08
22:10	340.250	7.11	-0.05	0.08
22:30	360.220	7.12	-0.06	0.09
22:50	380.080	7.12	-0.06	0.09
23:10	400.080	7.12	-0.06	0.09
23:30	420.150	7.12	-0.06	0.09
23:50	440.080	7.11	-0.05	0.08
00:10	460.220	7.11	-0.05	0.08
00:30	480.220	7.11	-0.05	0.08
00:50	500.220	7.11	-0.05	0.08
01:10	520.220	7.11	-0.05	0.08
01:30	540.220	7.10	-0.04	0.07
01:50	560.220	7.11	-0.05	0.08
02:10	580.220	7.10	-0.04	0.07
02:30	600.220	7.10	-0.04	0.07
02:50	620.220	7.10	-0.04	0.07
03:10	640.220	7.10	-0.04	0.07
03:30	660.220	7.09	-0.03	0.06
03:50	680.220	7.09	-0.03	0.06
04:10	700.220	7.09	-0.03	0.06
04:30	720.220	7.09	-0.03	0.06
04:50	740.220	7.08	-0.02	0.05
05:10	760.220	7.08	-0.02	0.05
05:30	780.220	7.08	-0.02	0.05
05:50	800.220	7.08	-0.02	0.05
06:10	820.220	7.08	-0.02	0.05
06:30	840.220	7.08	-0.02	0.05
06:50	860.220	7.09	-0.03	0.06
07:10	880.180	7.08	-0.02	0.05
07:30	900.180	7.09	-0.03	0.06
07:50	920.180	7.10	-0.04	0.07
08:10	940.180	7.10	-0.04	0.07
08:30	960.180	7.10	-0.04	0.07
08:50	980.170	7.10	-0.04	0.07
09:10	1000.200	7.12	-0.06	0.09
10:10	1060.400	7.11	-0.05	0.08
11:10	1120.700	7.14	-0.08	0.11
12:10	1180.300	7.13	-0.07	0.10
13:10	1240.300	7.05	0.01	0.02
14:10	1300.400	-999.99	1007.05	1007.02
15:10	1360.300	-999.99	1007.05	1007.02
16:10	1420.200	7.05	0.01	0.02
17:10	1480.300	7.05	0.01	0.02
18:10	1540.300	7.05	0.01	0.02
19:10	1600.300	7.05	0.01	0.02
20:10	1660.300	7.06	0.00	0.03
21:10	1720.300	7.09	-0.03	0.06
22:10	1780.300	7.09	-0.03	0.06
23:10	1840.300	7.10	-0.04	0.07

00:10	1900.300	7.11	-0.05	0.08
01:10	1960.300	7.11	-0.05	0.08
02:10	2020.300	7.11	-0.05	0.08
03:10	2080.300	7.11	-0.05	0.08
04:10	2140.300	7.11	-0.05	0.08
05:10	2200.300	7.11	-0.05	0.08
06:10	2260.300	7.11	-0.05	0.08
07:10	2320.300	7.12	-0.06	0.09
08:10	2380.300	7.13	-0.07	0.10
09:10	2440.300	7.14	-0.08	0.11
10:10	2500.300	7.15	-0.09	0.12
11:10	2560.300	7.14	-0.08	0.11
12:10	2620.400	7.16	-0.10	0.13
13:10	2680.400	7.13	-0.07	0.10
14:10	2740.400	7.18	-0.12	0.15
15:10	2800.400	7.11	-0.05	0.08
16:10	2860.400	7.08	-0.02	0.05
17:10	2920.400	7.11	-0.05	0.08
18:10	2980.400	7.10	-0.04	0.07
19:10	3040.200	7.10	-0.04	0.07
20:10	3100.200	7.12	-0.06	0.09
21:10	3160.200	7.13	-0.07	0.10
22:10	3220.200	7.14	-0.08	0.11
23:10	3280.200	7.16	-0.10	0.13
00:10	3340.200	7.17	-0.11	0.14
01:10	3400.200	7.17	-0.11	0.14
02:10	3460.200	7.17	-0.11	0.14
03:10	3520.200	7.16	-0.10	0.13
04:10	3580.300	7.15	-0.09	0.12
05:10	3640.300	7.15	-0.09	0.12
06:10	3700.300	7.16	-0.10	0.13
07:10	3760.300	7.15	-0.09	0.12
07:36	3786.600	7.15	-0.09	0.12

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: DRAWDOWN
WELL NUMBER: REI 10-4 INPUT 11
RADIUS: 34.651 FEET
START DATE: 15-Sep-86
START TIME: 13:00
WATER START LEVEL: 7.52 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
13:00	0.000	7.52	0.00
13:00	0.017	-999.99	1007.51
13:00	0.034	-999.99	1007.51
13:00	0.050	-999.99	1007.51
13:00	0.067	-999.99	1007.51
13:00	0.084	-999.99	1007.51
13:00	0.100	-999.99	1007.51
13:00	0.117	-999.99	1007.51
13:00	0.134	-999.99	1007.51
13:00	0.150	-999.99	1007.51
13:00	0.167	-999.99	1007.51
13:00	0.257	7.53	-0.01
13:00	0.340	7.53	-0.01
13:00	0.424	7.53	-0.01
13:00	0.507	7.53	-0.01
13:00	0.590	7.53	-0.01
13:00	0.674	7.53	-0.01
13:00	0.757	7.54	-0.02
13:00	0.840	7.54	-0.02
13:00	0.924	7.55	-0.03
13:01	1.007	7.55	-0.03
13:01	1.417	7.56	-0.04
13:01	1.750	7.56	-0.04
13:02	2.084	7.56	-0.04
13:02	2.417	7.55	-0.03
13:02	2.750	7.55	-0.03
13:03	3.084	7.54	-0.02
13:03	3.417	7.53	-0.01
13:03	3.750	7.54	-0.02
13:04	4.084	7.54	-0.02
13:04	4.417	7.53	-0.01
13:04	4.750	7.53	-0.01
13:05	5.084	7.52	0.00
13:05	5.417	7.51	0.01
13:05	5.750	7.51	0.01
13:06	6.084	7.51	0.01
13:06	6.417	7.51	0.01
13:06	6.750	7.51	0.01
13:07	7.084	7.51	0.01
13:07	7.417	7.51	0.01

13:07	7.750	7.51	0.01
13:08	8.084	7.51	0.01
13:08	8.417	7.51	0.01
13:08	8.750	7.51	0.01
13:09	9.084	7.51	0.01
13:09	9.417	7.51	0.01
13:09	9.750	7.51	0.01
13:10	10.084	7.51	0.01
13:12	12.101	7.51	0.01
13:14	14.188	7.52	0.00
13:16	16.139	7.50	0.02
13:18	18.237	7.49	0.03
13:20	20.233	7.50	0.02
13:22	22.233	7.49	0.03
13:24	24.233	7.50	0.02
13:26	26.233	7.49	0.03
13:28	28.233	7.49	0.03
13:30	30.233	7.49	0.03
13:32	32.152	7.48	0.04
13:34	34.620	7.49	0.03
13:36	36.095	7.49	0.03
13:38	38.095	7.49	0.03
13:40	40.095	7.48	0.04
13:42	42.195	7.48	0.04
13:44	44.232	7.48	0.04
13:46	46.232	7.48	0.04
13:48	48.252	7.48	0.04
13:50	50.122	7.48	0.04
13:52	52.122	7.49	0.03
13:54	54.122	7.48	0.04
13:56	56.122	7.47	0.05
13:58	58.122	7.49	0.03
14:00	60.122	7.47	0.05
14:02	62.122	7.46	0.06
14:04	64.122	7.46	0.06
14:06	66.442	7.47	0.05
14:08	68.122	7.48	0.04
14:10	70.335	7.48	0.04
14:12	72.160	7.47	0.05
14:14	74.160	7.46	0.06
14:16	76.167	7.46	0.06
14:18	78.230	7.45	0.07
14:20	80.217	7.46	0.06
14:22	82.213	7.45	0.07
14:24	84.213	7.45	0.07
14:26	86.213	7.45	0.07
14:28	88.213	7.45	0.07
14:30	90.213	7.44	0.08
14:32	92.213	7.44	0.08
14:34	94.213	7.43	0.09
14:36	96.213	7.43	0.09
14:38	98.238	7.43	0.09
15:00	120.220	7.42	0.10
15:20	140.130	7.39	0.13
15:40	160.130	7.37	0.15
16:00	180.370	7.37	0.15

16:20	200.200	7.36	0.16
16:40	220.200	7.35	0.17
17:00	240.080	7.34	0.18
17:20	260.220	7.33	0.19
17:40	280.150	7.32	0.20
18:00	300.150	7.32	0.20
18:20	320.130	7.30	0.22
18:40	340.220	7.29	0.23
19:00	360.180	7.29	0.23
19:20	380.220	7.28	0.24
19:40	400.220	7.27	0.25
20:00	420.220	7.27	0.25
20:20	440.220	7.27	0.25
20:40	460.220	7.27	0.25
21:00	480.120	7.27	0.25
21:20	500.220	7.27	0.25
21:40	520.320	7.27	0.25
22:00	540.200	7.27	0.25
22:20	560.100	7.26	0.26
22:40	580.100	7.25	0.27
23:00	600.150	7.25	0.27
23:20	620.150	7.24	0.28
23:40	640.180	7.24	0.28
00:00	660.180	7.23	0.29
00:20	680.180	7.23	0.29
00:40	700.180	7.23	0.29
01:00	720.180	7.23	0.29
01:20	740.180	7.22	0.30
01:40	760.180	7.22	0.30
02:00	780.180	7.22	0.30
02:20	800.180	7.21	0.31
02:40	820.180	7.20	0.32
03:00	840.180	7.20	0.32
03:20	860.180	7.19	0.33
03:40	880.180	7.19	0.33
04:00	900.180	7.18	0.34
04:20	920.180	7.19	0.33
04:40	940.180	7.19	0.33
05:00	960.180	7.18	0.34
05:20	980.180	7.18	0.34
05:40	1000.200	7.17	0.35
06:40	1060.400	7.17	0.35
07:40	1120.500	7.18	0.34
08:40	1180.300	7.18	0.34
09:40	1240.300	7.18	0.34
10:40	1300.200	7.19	0.33
11:40	1360.300	7.18	0.34
12:40	1420.300	7.16	0.36
13:40	1480.200	7.15	0.37
14:40	1540.300	7.11	0.41
15:40	1600.300	7.09	0.43
16:30	1650.600	7.07	0.45

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 1
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-4 INPUT 11
RADIUS: 34.651 FEET
START DATE: 15-Sep-86
START TIME: 16:30
WATER START LEVEL: 7.52 FEET
WATER STOP LEVEL: 7.07 FEET
TOTAL PUMPING TIME: 1650.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
16:30	0.017	-999.99	1007.06	1007.51
16:30	0.034	-999.99	1007.06	1007.51
16:30	0.050	-999.99	1007.06	1007.51
16:30	0.067	-999.99	1007.06	1007.51
16:30	0.084	-999.99	1007.06	1007.51
16:30	0.100	-999.99	1007.06	1007.51
16:30	0.117	-999.99	1007.06	1007.51
16:30	0.134	-999.99	1007.06	1007.51
16:30	0.150	-999.99	1007.06	1007.51
16:30	0.167	-999.99	1007.06	1007.51
16:30	0.257	7.07	0.00	0.45
16:30	0.340	7.07	0.00	0.45
16:30	0.424	7.07	0.00	0.45
16:30	0.507	7.07	0.00	0.45
16:30	0.591	7.07	0.00	0.45
16:30	0.674	7.07	0.00	0.45
16:30	0.757	7.07	0.00	0.45
16:30	0.840	7.07	0.00	0.45
16:30	0.924	7.07	0.00	0.45
16:31	1.007	7.07	0.00	0.45
16:31	1.417	7.07	0.00	0.45
16:31	1.751	7.07	0.00	0.45
16:32	2.084	7.07	0.00	0.45
16:32	2.417	7.07	0.00	0.45
16:32	2.751	7.07	0.00	0.45
16:33	3.084	7.07	0.00	0.45
16:33	3.417	7.07	0.00	0.45
16:33	3.751	7.07	0.00	0.45
16:34	4.084	7.07	0.00	0.45
16:34	4.417	7.07	0.00	0.45
16:34	4.751	7.07	0.00	0.45
16:35	5.084	7.07	0.00	0.45
16:35	5.417	7.07	0.00	0.45
16:35	5.751	7.08	-0.01	0.44
16:36	6.084	7.08	-0.01	0.44
16:36	6.417	7.08	-0.01	0.44
16:36	6.751	7.08	-0.01	0.44
16:37	7.084	7.09	-0.02	0.43

16:37	7.417	7.08	-0.01	0.44
16:37	7.751	7.09	-0.02	0.43
16:38	8.084	7.08	-0.01	0.44
16:38	8.417	7.08	-0.01	0.44
16:38	8.751	7.08	-0.01	0.44
16:39	9.084	7.08	-0.01	0.44
16:39	9.417	7.08	-0.01	0.44
16:39	9.751	7.08	-0.01	0.44
16:40	10.084	7.08	-0.01	0.44
16:42	12.120	7.07	0.00	0.45
16:44	14.120	7.07	0.00	0.45
16:46	16.120	7.06	0.01	0.46
16:48	18.120	7.07	0.00	0.45
16:50	20.142	7.07	0.00	0.45
16:52	22.225	7.06	0.01	0.46
16:54	24.225	7.07	0.00	0.45
16:56	26.225	7.06	0.01	0.46
16:58	28.225	7.06	0.01	0.46
17:00	30.225	7.06	0.01	0.46
17:02	32.225	7.06	0.01	0.46
17:04	34.225	7.06	0.01	0.46
17:06	36.225	7.06	0.01	0.46
17:08	38.225	7.06	0.01	0.46
17:10	40.225	7.06	0.01	0.46
17:12	42.225	7.06	0.01	0.46
17:14	44.225	7.06	0.01	0.46
17:16	46.225	7.06	0.01	0.46
17:18	48.225	7.06	0.01	0.46
17:20	50.342	7.06	0.01	0.46
17:22	52.220	7.06	0.01	0.46
17:24	54.222	7.06	0.01	0.46
17:26	56.222	7.06	0.01	0.46
17:28	58.220	7.06	0.01	0.46
17:30	60.120	7.06	0.01	0.46
17:32	62.220	7.06	0.01	0.46
17:34	64.222	7.06	0.01	0.46
17:36	66.220	7.06	0.01	0.46
17:38	68.220	7.06	0.01	0.46
17:40	70.220	7.06	0.01	0.46
17:42	72.220	7.06	0.01	0.46
17:44	74.222	7.06	0.01	0.46
17:46	76.095	7.06	0.01	0.46
17:48	78.180	7.06	0.01	0.46
17:50	80.575	7.06	0.01	0.46
17:52	82.215	7.06	0.01	0.46
17:54	84.215	7.06	0.01	0.46
17:56	86.215	7.06	0.01	0.46
17:58	88.215	7.06	0.01	0.46
18:00	90.493	7.06	0.01	0.46
18:02	92.210	7.05	0.02	0.47
18:04	94.248	7.06	0.01	0.46
18:06	96.248	7.06	0.01	0.46
18:08	98.248	7.06	0.01	0.46
18:30	120.250	7.05	0.02	0.47
18:50	140.250	7.05	0.02	0.47
19:10	160.180	7.05	0.02	0.47

19:30	180.170	7.05	0.02	0.47
19:50	200.220	7.05	0.02	0.47
20:10	220.150	7.06	0.01	0.46
20:30	240.150	7.06	0.01	0.46
20:50	260.150	7.07	0.00	0.45
21:10	280.250	7.08	-0.01	0.44
21:30	300.250	7.08	-0.01	0.44
21:50	320.250	7.08	-0.01	0.44
22:10	340.250	7.08	-0.01	0.44
22:30	360.220	7.08	-0.01	0.44
22:50	380.080	7.08	-0.01	0.44
23:10	400.080	7.07	0.00	0.45
23:30	420.150	7.07	0.00	0.45
23:50	440.080	7.06	0.01	0.46
00:10	460.220	7.07	0.00	0.45
00:30	480.220	7.06	0.01	0.46
00:50	500.220	7.06	0.01	0.46
01:10	520.220	7.05	0.02	0.47
01:30	540.220	7.05	0.02	0.47
01:50	560.220	7.04	0.03	0.48
02:10	580.220	7.04	0.03	0.48
02:30	600.220	7.03	0.04	0.49
02:50	620.220	7.02	0.05	0.50
03:10	640.220	7.02	0.05	0.50
03:30	660.220	7.01	0.06	0.51
03:50	680.220	7.00	0.07	0.52
04:10	700.220	7.00	0.07	0.52
04:30	720.220	6.99	0.08	0.53
04:50	740.220	6.98	0.09	0.54
05:10	760.220	6.98	0.09	0.54
05:30	780.220	6.98	0.09	0.54
05:50	800.220	6.98	0.09	0.54
06:10	820.220	6.98	0.09	0.54
06:30	840.220	6.98	0.09	0.54
06:50	860.220	6.99	0.08	0.53
07:10	880.180	6.98	0.09	0.54
07:30	900.180	7.08	-0.01	0.44
07:50	920.180	7.07	0.00	0.45
08:10	940.180	7.05	0.02	0.47
08:30	960.180	7.04	0.03	0.48
08:50	980.170	7.03	0.04	0.49
09:10	1000.200	7.11	-0.04	0.41
10:10	1060.400	7.08	-0.01	0.44
11:10	1120.700	7.12	-0.05	0.40
12:10	1180.300	7.08	-0.01	0.44
13:10	1240.300	7.01	0.06	0.51
14:10	1300.400	7.04	0.03	0.48
15:10	1360.300	6.98	0.09	0.54
16:10	1420.200	7.01	0.06	0.51
17:10	1480.300	6.97	0.10	0.55
18:10	1540.300	7.03	0.04	0.49
19:10	1600.300	7.00	0.07	0.52
20:10	1660.300	6.98	0.09	0.54
21:10	1720.300	7.09	-0.02	0.43
22:10	1780.300	7.08	-0.01	0.44
23:10	1840.300	7.07	0.00	0.45

00:10	1900.300	7.05	0.02	0.47
01:10	1960.300	7.03	0.04	0.49
02:10	2020.300	7.01	0.06	0.51
03:10	2080.300	7.09	-0.02	0.43
04:10	2140.300	7.06	0.01	0.46
05:10	2200.300	7.04	0.03	0.48
06:10	2260.300	7.02	0.05	0.50
07:10	2320.300	7.01	0.06	0.51
08:10	2380.300	7.02	0.05	0.50
09:10	2440.300	7.13	-0.06	0.39
10:10	2500.300	7.13	-0.06	0.39
11:10	2560.300	7.11	-0.04	0.41
12:10	2620.400	7.10	-0.03	0.42
13:10	2680.400	7.06	0.01	0.46
14:10	2740.400	7.04	0.03	0.48
15:10	2800.400	7.01	0.06	0.51
16:10	2860.400	6.99	0.08	0.53
17:10	2920.400	6.98	0.09	0.54
18:10	2980.400	6.98	0.09	0.54
19:10	3040.200	6.97	0.10	0.55
20:10	3100.200	6.97	0.10	0.55
21:10	3160.200	7.07	0.00	0.45
22:10	3220.200	7.08	-0.01	0.44
23:10	3280.200	7.09	-0.02	0.43
00:10	3340.200	7.09	-0.02	0.43
01:10	3400.200	7.08	-0.01	0.44
02:10	3460.200	7.07	0.00	0.45
03:10	3520.200	7.05	0.02	0.47
04:10	3580.300	7.03	0.04	0.49
05:10	3640.300	7.03	0.04	0.49
06:10	3700.300	7.03	0.04	0.49
07:10	3760.300	7.01	0.06	0.51
07:36	3786.600	7.02	0.05	0.50

PUMP TEST DATA SHEET FOR REI 10-1 SHEET 1 OF ___

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 9/16/86

WELL NUMBER: Staff gauge in pond
r IN FEET:
STARTING WATER LEVEL:

16:30:40 recovery began

9/17/86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
19:42		74.51	~~DRG~~ DWD		
23:43		74.53	S.C		
04:14		74.51	S.C	not initialed	because
08:04		74.51		recopied from	another sheet
16:09		74.50	DRG		
19:40		74.49	DRG		
23:01		74.49	DWD		
402		74.49	SC		
802		74.48	BAB		
12.02		74.48	J.A.		
1619		74.48	DD		
1955		74.48	DWD		
0:17		74.48	SC		
3:54		74.50	SC		

REI

PUMP TEST DATA SHEET FOR REI 10-1 SHEET 1 OF

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 9-16-86

WELL NUMBER: GW-25
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r²	ΔH (RESIDUAL DRAWDOWN)	t/t'
	19:46	196	87.83	DWD ~~DRG~~				
	23:48	438	86.82	SC				
9/17/86	04:15	705	86.12	S.C	~~not init~~			
	08:05	935	85.72					
	12:01	1291	85.38					
	16:12		85.095	DRG				
	19:42		84.90	DRG				
	23:05		84.74	DWD				
	404		84.51	SC				
	803		84.35	JG				
	12.04		84.20	J.A.				
	16:02		84.08	DRG				
	19:58		83.975	DWD				
	0:15		83.87	SC				
	3:56		83.77	SC				

REI

PUMP TEST DATA SHEET FOR REI 10-1

SHEET 1 OF

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 09/16/86

WELL NUMBER: REI-11
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
	19:53		83.85	D.W.D		
	23:53		82.88	S.C		
9/17/86	04:06		82.23	S.C		
	08:25		81.79			
	12:08		81.49			
	16:18		81.25	DRG		
	19:49		81.075	DRG		
	23:09		80.93	D.W.D		
	4:10		80.73	SC		
	8.09		80.59	Y.A.		
	12.10		80.46	Y.A.		
	1608		80.37	DRG		
	2004		80.275	DWD		
	0:07		80.20	SC		
	4:02		80.10	SC		

REI

PUMP TEST DATA SHEET FOR REI-10-1 SHEET ___ OF ___

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 09/16/86

WELL NUMBER: REI-3-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
	19:58		85.985	DWD				
	23:57		85.06					
9/17/86	04:09		84.44					
	08:30		84.03					
	12:12		83.74					
	16:25		83.49	DRG				
	19:54		83.32	DRG				
	23:14		83.19	DWD				
	4:14		82.99	SC				
	8.14		82.86	[illegible]				
	12.14		82.76	[illegible]				
	1614		82.66	DRG				
	2008		82.575	DWD				
	0:11		82.47	SC				
	4:06		82.39	SC				

REI

Appendix 19

REI 10-1 Run #2 Pumping Test Data Sheets

FRENCH Ltd. REI 10-1 Pump Test
Run
10/07/86

SE200B DATA
constant rate test

TRANSDUCER TABLE

Input 1: REI 10-1
Transducer s/n: 139
Scale factor: 49.59
Initial level: 81.34 feet

FAST DATA

Input 2: REI-11
Transducer s/n: 1076/849
Scale factor: 10.07
Initial level: 78.42 feet

Input 3: none
Transducer s/n: none
Scale factor: 1

Input 4: REI 3-4
Transducer s/n: 1059/854
Scale factor: 10.09
Initial level: 80.79 feet

Input 5: REI-7
Transducer s/n: 1366/851
Scale factor: 10.09
Initial level: 80.33 feet

Input 6: P-10-2
Transducer s/n: 1634/857
Scale factor: 10.08
Initial level: 46.06 feet

Input 7: P-10-3
Transducer s/n: 1518/854
Scale factor: 10.08
Initial level: 39.72 feet

Input 8: P-10-4
Transducer s/n: 2344/85n
Scale factor: 10.13
Initial level: 38.82 feet

Input 9: REI 10-2
Transducer s/n: 516/830
Scale factor: 10.04
Initial level: 5.78 feet

Input 10: REI 10-7
Transducer s/n: 596/841
Scale factor: 10.03
Initial level: 7.14 feet

Input 11: REI 10-4
Transducer s/n: 1631/857
Scale factor: 10.09
Initial level: 7.66 feet

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ____

PROJECT: French Ltd RET/O-1 Run #2 10-7-86 JOB NO.: ____

SUBJECT: FLOW RATE MONITORING SHEET 10-7-86

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

within .5 of 12.0 after 30 seconds into test 1

FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
0	0:900:00	QCM	Teststart	12.1→12.0	10:20	J.A.
12.0	0900:18	QCM		12.1→12.0	10:25	J.A.
12.0	0902	QCM		12.0	10:31	J.A.
12.0	0904	QCM		11.9→12.0	10:35	J.A.
12.0	0906	QCM		12.1→12.0	10:40	J.A.
11.9 ~~12.0~~ D.W.D	0908	~~QCM~~ DWD		12.1→12.0	10:45	J.A.
11.9	0910	DWD		12.0→12.0	10:50	DWD
11.8→12.0	0912	DWD		12.1	10:55	DWD
12.0	0914	DWD		12.1	10:59	DWD
12.0	0916	DWD		12.1	110:7	DWD
12.0	0918	DWD		12.0	11:10	DWD
12.0	0920	DWD		12.0	11:15	DWD
12.0	0922	DWD		12.0	11:20	D.W.D
12.0→11.9	0924	DWD		12.0	11:25	D.W.D
12.0→11.9	0926	DWD	readings on 2min intervals	12.0	11:30	D.W.D
12.0	0928	DWD		12.0	11:36	J.A.
12.0	0930	DWD	5	12.0	11:40	J.A.
11.9	0935	DWD		12.0	11:45	J.A.
11.9	0939	QCM	Readings on 5 min. intervals	12.0	11:50	J.A.
12.0	0940	QCM		12.0	11:55	J.A.
12.0	0945	QCM	5 min interval	12.0	12:00	D.W.D
12.0	0950	QCM	15 min interval	12.1	12:17	D.W.D
12.0	0954	QCM		12.0	12:30	D.W.D
12.1→12.0	10:00	J.A.	0	12.0	12:43	D.W.D
12.0	10:05	J.A.	15	12.0→12.2	1:00	D.W.D
12.0	10:10	J.A.	bucket method	11.9	13:15	DWD
12.0	10:15	J.A.	17.8gpm→ D.W.D.	12.1	13:30	D.W.D

2

flow drift ↑+↓

[redacted]

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF ____

PROJECT: French Ltd. REI 10-1 Run #2 — JOB NO.: ____

10-7-86 - 10-8[illegible]

SUBJECT: FLOW RATE MONITORING SHEET — COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

m

FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
12.1 ~~120~~	13:45	[illegible]	5 gal/17 sec	12.3	1901	MC
12.1 → 120	14:00	[illegible]				
12.0 - 12.1	14:15	D.W.D				
12.1	14:30	D.W.D	5 gal/17 sec	10/7/86	2258	TP
12.0	14:45	[illegible]	5 gal/17 sec			
12.0 → 12.1	15:00	A.B	5 gal/16.5 sec		00:30	[illegible]
12.0	15:10	A.B	5 gal/17 sec	10/8/86	1:30	[illegible]
12.1	15:25	D.W.D	[illegible]		[illegible]	
11.8 - 11.9	15:35	AB	5 gal/17 sec		4:30	A.T.
12.0	15:40	AB	5 gal/17 sec		6:00	A-T.
12.1	15:50	AB	5 gal/17 sec.		7:10.	D.WD
[illegible]	16:00	AB	5 gal/17-18 sec.		7:44	D.W.D
12.1	16:10	AB	5 gal/17-18 sec		8:00	D.W.D
12.0	16:20	AB	5 gal/17-18 sec.	10.2 (meter)	8:15	D.W.D
12.1	16:30	AB	5 gal/17-18 sec	10.2 (meter)	8:30	D.W.D
12.1	16:42	AB	5 gal/17-18 sec.	10.2 - (meter)	8:45	D.W.D
12.0	16:50	AB	5 gal/17-18 sec.	10.2 (meter)	9:00	D.W.D
11.9	16:59	D.W.D	5 gal/17-18 sec	10.2 (meter)	9:15	D.W.D
12.1	17:17	D.W.D	5 gal/17 sec.	10.1 (meter)	9:30	D.W.D
12.1	17:45	AB	5 gal/17-18 sec.	9.9 (meter)	9:45	D.W.D
36.7	18:08	D.W.D	← valve opened wide	5 gal/17-18 sec. 9.5 (meter)	10:03	D.W.D
17.0	18:10	D.W.D	13 sec/5 gal	5 gal/17-18 sec 9.3 (meter)	10:16	D.W.D
12.0	18:11	D.W.D	17 sec/5 gal	5 gal/17-18 sec 9.9 (meter)	10:30	D.W.D
12.5	18:27	D.W.D	17-18 sec/5 gal	5 gal/17-18 sec 9.8 (meter)	10:45	D.W.D
12.4	18:28	D.W.D	17-18 sec/5 gal.	5 gal/17-18 sec (10 meter)	11:01	D.W.D
12.4	1843	MC	17 sec/5 gal	5 gal/17-18 sec.	11:16	D.W.D
12.3	1900	MC	17 sec/5 GAL	5 gal/17-18 sec	11:45	D.W.D

Bucket method = 17 gpm — T.A.

Bucket 17.5 gpm — A.B

5 g / 19 sec

Bucket method 15.8 gpm — AB

BUCKET 5 g/17 SEC MC

CALCULATIONS AND COMPUTATIONS

SHEET 3 OF ____

PROJECT: French Ltd. REI 10-1

JOB NO.:

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

10/8/86

FLOW RATE	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
5gal/17-18 sec.	12:08	DRG	5gal/17	5:31 sec	A.T
5gal/17-18s.	12:30	DWD	5gal/17	6:15 sec	A.T
5gal/17.88s	12:47	DWD/DRG	5gal/17.8	7:00 sec.	A.T
5gal/17.88sec.	13:00	DWD	5gal/17.9sec.	7:30	D.W.D
5gal/18sec.	13:45	DWD	5gal/17.41sec	8:39	D.W.D
5gal/17-18sec	14:00	DWD	5gal/17.42s	9:36	DRG
5gal/17.88s	14:35	DWD	5gal/17.61sec	10:02	DWD
5gal/17.84s	14:46	DWD	5gal/17.64s	10:31	DWD
5gal/17.90s	15:02	DWD	5gal/17.62s	11:01	DWD
5gal/17.65sec	16:05	M.C	5gal/17.53s	11:35	DRG
5gal/17.5sec.	17:10	M.C	5gal/17.79s	12:04	DRG
5gal/17.03sec.	17:35	M.C	5gal/17.87s	12:30	DRG
5gal/17.5sec.	18:10	M.C	5gal/17.50s	13:02	DWD
5gal/17.5sec.	19:46	MC	5gal/17.~~73~~ 70 sec	13:30	DRG
5gal/17.5sec	20:45	MC	5gal/17.93s	14:01	DWD
5gal/17.5sec	21:30	M.C	5gal/17.66s	14:31	DWD
5gal/17.5sec	22:15	M.C	5gal/17.70s	15:02	DWD
5gal/17.5sec	2330	A.T	5GAL/17.5s	16:00	MC
5gal/17.5sec	0:00	A.T	5GAL/17.5s	1630	MC
5gal/17.5sec	0032	A.T	5GAL/17.2	1659	MC
5gal/17.5sec	1:08	A.T	5GAL/17.5s	1730	MC
5gal/17sec	1:31	A.T	5GAL/17.5s	1800	MC
5gal/17sec	2:10	A.T	5gal/17.67sec	19:15	A.B
5gal/17sec	2:57	A.T	5gal/17.64	20:21	A.B
5gal/17sec	3:38	A.T	5gal/17.56	2100	MC
5gal/17sec	4:00	A.T	5GAL/17.25	2200	AB
5gal/17sec	4:50	A.T	5Gal/17.5	2300	A.T

15

70-60

10/9/86

watch is not digital

CALCULATIONS AND COMPUTATIONS

SHEET 4 OF ____

PROJECT: French Ltd REI IC-1

JOB NO.: ____

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

10-10-86

FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
~~0000~~ 5Gal/17.5	00:02	A.T.		5gal/17.9s	14:05	DWD
5Gal/17.5	01:05	A.T		5gal/17.6s	14:31	DWD
5Gal/17	02:03	A-T		5gal/17.5s	15:06	DWD
5Gal/17	03:04	A-T		5gal/17.55sec.	15:31	DWD
5Gal/17	03:50	A.T		5gal/17.31	16:04	[illegible]
5Gal/17	05:06	A.T		5gal/17.23	16:38	A.B
5Gal/17	06:01	A-T	Switched generators A.B	5gal/18.70	17:40	AB
5Gal/17	06:57	A-T,		5gal/18.66	18:04	AB.
5gal/17.43	07:13	DWD	adjusted flow rate A.B.	5gal/17.61sec	18:05	AB
5gal/17.5sec	7:30	D.W.D		5gal/17.60	18:30	JG
5gal/17.55sec	7:45	DWD		5gal/17.57	19:05	AB
5gal/[illegible]sec	8:00	DWD		5gal/17.25	19:32	A.B
5gal/17.84sec	8:21	DWD		5gal/17.19	20:15	JG.
5gal/17.5sec	8:30	DWD		5gal/17.30	20:34	J.G.
5gal/17.6s	8:47	DWD		5gal/17.60	21:00	J.G.
5gal/17.93s	9:00	DWD		5gal/17.51	21:35	JG.
5gal/17.56sec	9:30	D.W.D		5gal/17.53	22:10	JG.
5gal/17.37sec	10:00	DWD		5gal/17.66	22:50	AB
5gal/17.56sec	10:30	DWD		5gal/17	23:54	A.T.
5gal/17.5s.	11:00	DRG		5Gal/17.5	01:14	A.T
5gal/17.5sec.	11:30	DWD	10/11/86	5Gal/17.5	02:08	A.T
5gal/17.55	12:00	DWD		5Gal/17.5	03:11	A.T.
5gal/17.73s	12:10	DWD		5Gal/17.5	04:02	A.T.
5gal/17.73s	12:23	DWD		5Gal/17.5	05:03	A.T
5gal/17.8s	12:45	DWD		5Gal/17.5	06:01	A.T
5gal/17.5s	13:14	DWD		5Gal/17.5	06:55	A.T
5gal/17.13s	13:51	DWD		5gal/17.7	08:02	A.B.

1208 Pump turned off for 2 seconds

CALCULATIONS AND COMPUTATIONS SHEET 5 OF ____

PROJECT: French Ltd REI 10-1 JOB NO.: ____

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

	FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
10/11/86	5gal/17.6s	08:30	AB		5gal/17.5sec	800	DWD
	5gal/17.4s	09:02	DRG		5gal/17.5sec	830	DWD
	5gal/17.6s	09:33	DRG		[illegible]	[illegible]	[illegible]
	5gal/17.9s	10:02	DRG		[illegible]	[illegible]	
	5gal/17.8s	10:34	DRG		[illegible]	[illegible]	
	5gal/17.7s	10:56	DRG		5gal/17.5sec	1034	DWD
	5gal/17.67	11:58	AB		5gal/17.5sec	11:15	DWD
	5gal/17.5s	12:57	DRG		5gal/17.5sec	11:30	DWD
	5gal/17.82	13.53	AB.		5gal/17.5sec	1204	DWD
	5gal/17.7	14:57	DRG		5gal/17.5sec	12:30	DWD
	5gal./17.8s	15:25	DD		5gal/17.5sec	13:10	DWD
	5gal/17.75s	16:00	DD		5gal/17.5sec	14:00	DWD
	5GAL/17.7	1650	MC		5gal/17.5sec	14:30	DWD
	5GAL/17.6	1730	MC		5gal/17.5s	15:20	DWD
	5gal/17.9	1800	DD		5GAL/17.5	1720	MC
	5gal/17.95	1856	DD		5GAL/17.4	1840	MC
	5gal/17.66	2000	DD		5GAL/17.5	2019	MC
	5GAL/17.6	2104	MC		5gal/17.81	21:12	AB
	5GAL/17.7	2202	MC		5gal/17.35	2234	MC
	5gal/17.7	2306	DD	10-13-86	5GAL/17.55	2319	MC
	5gal/17.5	00:08	A.T.		5GA/17.5	01:20	J.B.
	5Gal/17.5	01:21	A.T		5GAL/18 sec	03:12	J.B
	5Gal/17.5	02:04	A-T		5/GAL. 17.5	05:30	J.B.
	5Gal/17.5	03:12	A.T.		5gal/17.8	07:13	DRG
10-12-86	5Gal/17.5	04:02	A.T		5gal/17.83	07:32	DRG
	5Gal/17.5	05:08	A.T		5gal/17.95	08:06	PCM
	5Gal/17.5	06:58	A-T.		5gal/17.87	08:55	DRG
	5gal/17.5sec	7:30	DWD		5gal/18.08	09:12	PCM

REI

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

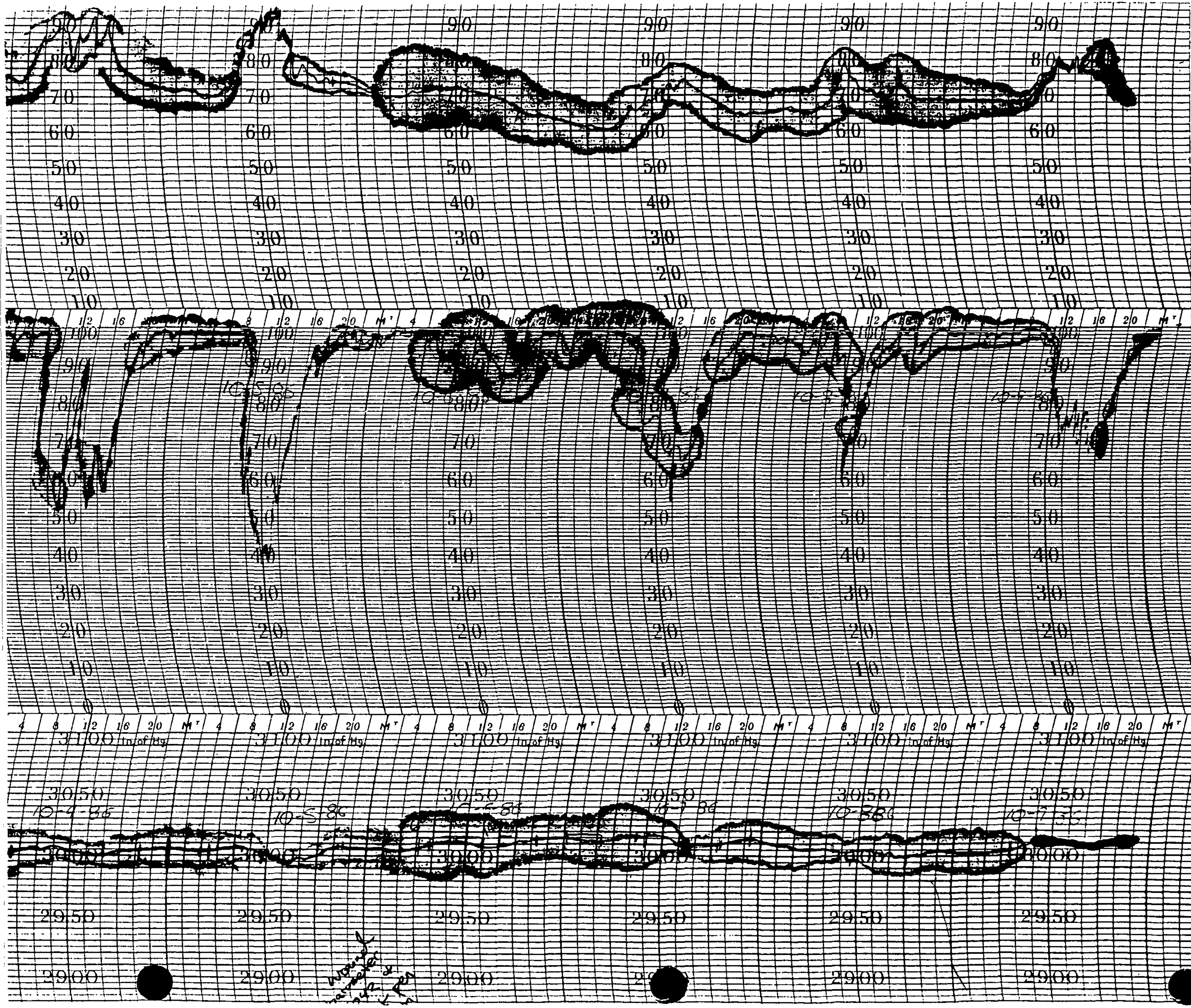
PROJECT: ____________ JOB NO.: ____________

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

	FLOW RATE	TIME (2400)	MONITORS INITIALS		FLOW RATE	TIME (2400)	MONITORS INITIALS
10-13-86	5gal/17.70	10:32	pcm		5gal/17.9sec	10:15	DWD
	5gal/17.64	11:32	DRG	17.01	[illegible]/17.[illegible]	10:5[illegible]	[illegible]
	5gal/17.44	11:50	pcm	17.20	5gal/17.7sec	11:08	DWD
	5gal/17.27	12:30	pcm	17.37	Pump turned off	1110	DWD
	5gal 17.06	13:10	pcm	17.58			
adj rate slightly at 13:11	5gal/17.98	13:13	pcm	16.67			
	5gal 17.82	13:18	pcm	16.84			
	5gal/17.63	13:38	DRG	17.02			
	5gal/18.21	13:58	pcm	16.42			
	5gal/17.79	14:14	DRG	16.86			
	5gal 17.83	14:29	pcm	16.83			
	5gal/18.17	14:41	pcm	16.51			
adj rate at 14:42	5gal/17.59	14:44	pcm	17.06			
	5gal/17.69	14:45	pcm	16.96			
	5gal/17.69	14:46	pcm	16.96			
	5 gal/17.71	14:50	pcm	16.94			
	5gal/17.87	15:09	pcm	16.79			
10-14-86	5gal/17.60	15:30	pcm				
	5gal/17	00:02	A-T				
	5gal/17	01:05	A-T.				
	5gal/17	02:02	A-T.				
	5gal/17	03:25	A-T.				
	5gal/17	05:01	A-T.				
	5gal/17	06:07	A-T.				
	5gal/17.6sec	7:07	DWD				
	5gal/17.5sec	8:00	DWD				
	5gal/17.9sec	900	DWD				



C701-W
P/N 69

Pump Test 10-1 Run #2

DATE OFF 2100 10-9-86

METEORO GRAPH

DATE ON 10-3-86

WEATHERMEASURE CORPORATION

STATION FRENCH LTD

C701-W-F
P/N 6990

WeatherMeasure Corporation

METEORO GRAPH

DATE ON 2100 10-9-86

DATE OFF

STATION FRENCH LTD

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-1 INPUT 1
RADIUS: 0.166 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 81.34 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
09:00	0.000	81.34	0.00	0.00E+00
09:00	0.017	81.73	-0.39	4.28E-04
09:00	0.034	85.94	-4.60	8.57E-04
09:00	0.050	88.12	-6.78	1.26E-03
09:00	0.067	90.19	-8.85	1.69E-03
09:00	0.084	90.69	-9.35	2.12E-03
09:00	0.100	90.69	-9.35	2.52E-03
09:00	0.117	91.89	-10.55	2.95E-03
09:00	0.134	92.38	-11.04	3.38E-03
09:00	0.150	92.11	-10.77	3.78E-03
09:00	0.167	91.99	-10.65	4.21E-03
09:00	0.257	93.98	-12.64	6.48E-03
09:00	0.340	94.35	-13.01	8.57E-03
09:00	0.424	95.47	-14.13	1.07E-02
09:00	0.507	96.37	-15.03	1.28E-02
09:00	0.590	97.33	-15.99	1.49E-02
09:00	0.674	97.97	-16.63	1.70E-02
09:00	0.757	98.77	-17.43	1.91E-02
09:00	0.840	99.24	-17.90	2.12E-02
09:00	0.924	99.48	-18.14	2.33E-02
09:01	1.007	100.16	-18.82	2.54E-02
09:01	1.414	102.16	-20.82	3.56E-02
09:01	1.748	103.14	-21.80	4.41E-02
09:02	2.081	103.76	-22.42	5.24E-02
09:02	2.414	104.27	-22.93	6.08E-02
09:02	2.748	104.83	-23.49	6.93E-02
09:03	3.081	105.07	-23.73	7.76E-02
09:03	3.415	105.47	-24.13	8.61E-02
09:03	3.748	105.65	-24.31	9.45E-02
09:04	4.081	105.97	-24.63	1.03E-01
09:04	4.414	106.12	-24.78	1.11E-01
09:04	4.748	106.19	-24.85	1.20E-01
09:05	5.081	106.32	-24.98	1.28E-01
09:05	5.414	106.38	-25.04	1.36E-01
09:05	5.748	106.46	-25.12	1.45E-01
09:06	6.081	106.47	-25.13	1.53E-01
09:06	6.415	106.47	-25.13	1.62E-01
09:06	6.748	106.66	-25.32	1.70E-01
09:07	7.081	106.66	-25.32	1.78E-01
09:07	7.415	106.79	-25.45	1.87E-01
09:07	7.748	106.88	-25.54	1.95E-01

09:08	8.081	106.89	-25.55	2.04E-01
09:08	8.415	106.90	-25.56	2.12E-01
09:08	8.748	107.03	-25.69	2.20E-01
09:09	9.081	107.09	-25.75	2.29E-01
09:09	9.414	107.23	-25.89	2.37E-01
09:09	9.748	107.10	-25.76	2.46E-01
09:10	10.081	107.25	-25.91	2.54E-01
09:12	12.108	107.38	-26.04	3.05E-01
09:14	14.152	108.13	-26.79	3.57E-01
09:16	16.152	108.23	-26.89	4.07E-01
09:18	18.152	108.46	-27.12	4.57E-01
09:20	20.152	108.58	-27.24	5.08E-01
09:22	22.152	108.66	-27.32	5.58E-01
09:24	24.152	108.86	-27.52	6.09E-01
09:26	26.152	108.94	-27.60	6.59E-01
09:28	28.215	109.09	-27.75	7.11E-01
09:30	30.197	109.37	-28.03	7.61E-01
09:32	32.197	109.45	-28.11	8.11E-01
09:34	34.197	109.71	-28.37	8.62E-01
09:36	36.197	109.67	-28.33	9.12E-01
09:38	38.197	109.95	-28.61	9.63E-01
09:40	40.197	110.14	-28.80	1.01E+00
09:42	42.197	110.14	-28.80	1.06E+00
09:44	44.197	110.28	-28.94	1.11E+00
09:46	46.197	110.48	-29.14	1.16E+00
09:48	48.197	110.55	-29.21	1.21E+00
09:50	50.197	110.68	-29.34	1.27E+00
09:52	52.197	110.79	-29.45	1.32E+00
09:54	54.197	111.15	-29.81	1.37E+00
09:56	56.217	111.25	-29.91	1.42E+00
09:58	58.100	111.38	-30.04	1.46E+00
10:00	60.245	111.57	-30.23	1.52E+00
10:02	62.245	111.64	-30.30	1.57E+00
10:04	64.245	111.60	-30.26	1.62E+00
10:06	66.245	111.48	-30.14	1.67E+00
10:08	68.245	111.62	-30.28	1.72E+00
10:10	70.245	111.74	-30.40	1.77E+00
10:12	72.245	111.77	-30.43	1.82E+00
10:14	74.245	111.71	-30.37	1.87E+00
10:16	76.245	111.87	-30.53	1.92E+00
10:18	78.245	111.87	-30.53	1.97E+00
10:20	80.245	111.81	-30.47	2.02E+00
10:22	82.245	111.78	-30.44	2.07E+00
10:24	84.245	111.82	-30.48	2.12E+00
10:26	86.245	111.88	-30.54	2.17E+00
10:28	88.245	111.82	-30.48	2.22E+00
10:30	90.245	111.84	-30.50	2.27E+00
10:32	92.245	111.84	-30.50	2.32E+00
10:34	94.245	111.92	-30.58	2.38E+00
10:36	96.245	111.98	-30.64	2.43E+00
10:38	98.245	112.05	-30.71	2.48E+00
11:00	120.210	112.14	-30.80	3.03E+00
11:20	140.210	111.99	-30.65	3.53E+00
11:40	160.210	112.18	-30.84	4.04E+00
12:00	180.220	112.45	-31.11	4.54E+00
12:20	200.220	112.64	-31.30	5.05E+00

12:40	220.220	111.57	-30.23	5.55E+00
13:00	240.220	111.64	-30.30	6.05E+00
13:20	260.220	111.02	-29.68	6.56E+00
13:40	280.230	110.68	-29.34	7.06E+00
14:00	300.230	111.42	-30.08	7.57E+00
14:20	320.230	109.88	-28.54	8.07E+00
14:40	340.180	109.24	-27.90	8.57E+00
15:00	360.100	109.74	-28.40	9.07E+00
15:20	380.100	109.58	-28.24	9.58E+00
15:40	400.100	109.41	-28.07	1.01E+01
16:00	420.170	109.37	-28.03	1.06E+01
16:20	440.250	109.19	-27.85	1.11E+01
16:40	460.200	109.15	-27.81	1.16E+01
17:00	480.170	108.99	-27.65	1.21E+01
17:20	500.170	109.64	-28.30	1.26E+01
17:40	520.130	109.59	-28.25	1.31E+01
18:00	540.120	110.47	-29.13	1.36E+01
18:20	560.220	114.26	-32.92	1.41E+01
18:40	580.080	115.83	-34.49	1.46E+01
19:00	600.220	115.83	-34.49	1.51E+01
19:20	620.230	116.13	-34.79	1.56E+01
19:40	640.220	116.20	-34.86	1.61E+01
20:00	660.220	116.17	-34.83	1.66E+01
20:20	680.130	116.29	-34.95	1.71E+01
20:40	700.120	116.23	-34.89	1.76E+01
21:00	720.230	116.37	-35.03	1.82E+01
21:20	740.300	116.73	-35.39	1.87E+01
21:40	760.230	116.67	-35.33	1.92E+01
22:00	780.230	116.71	-35.37	1.97E+01
22:20	800.230	116.91	-35.57	2.02E+01
22:40	820.180	116.96	-35.62	2.07E+01
23:00	840.570	117.03	-35.69	2.12E+01
23:20	860.180	117.13	-35.79	2.17E+01
23:40	880.080	117.17	-35.83	2.22E+01
00:00	900.170	117.20	-35.86	2.27E+01
00:20	920.170	117.34	-36.00	2.32E+01
00:40	940.170	117.40	-36.06	2.37E+01
01:00	960.170	117.47	-36.13	2.42E+01
01:20	980.170	117.43	-36.09	2.47E+01
01:40	1000.200	117.57	-36.23	2.52E+01
02:40	1060.300	117.72	-36.38	2.67E+01
03:40	1120.300	117.99	-36.65	2.82E+01
04:40	1180.300	118.20	-36.86	2.97E+01
05:40	1240.300	118.39	-37.05	3.13E+01
06:40	1300.300	118.19	-36.85	3.28E+01
07:40	1360.200	118.37	-37.03	3.43E+01
08:40	1420.200	118.14	-36.80	3.58E+01
09:40	1480.200	118.54	-37.20	3.73E+01
10:40	1540.200	118.46	-37.12	3.88E+01
11:40	1600.300	118.60	-37.26	4.03E+01
12:40	1660.300	118.80	-37.46	4.18E+01
13:40	1720.200	119.07	-37.73	4.34E+01
14:40	1780.300	119.33	-37.99	4.49E+01
15:40	1840.300	119.27	-37.93	4.64E+01
16:40	1900.300	119.29	-37.95	4.79E+01
17:40	1960.200	119.40	-38.06	4.94E+01

18:40	2020.200	119.60	-38.26	5.09E+01
19:40	2080.200	119.70	-38.36	5.24E+01
20:40	2140.200	119.80	-38.46	5.39E+01
21:40	2200.300	119.87	-38.53	5.55E+01
22:40	2260.300	120.07	-38.73	5.70E+01
23:40	2320.200	120.09	-38.75	5.85E+01
00:40	2380.200	120.30	-38.96	6.00E+01
01:40	2440.200	120.17	-38.83	6.15E+01
02:40	2500.200	120.52	-39.18	6.30E+01
03:40	2560.200	120.59	-39.25	6.45E+01
04:40	2620.200	120.56	-39.22	6.60E+01
05:40	2680.200	120.69	-39.35	6.75E+01
06:40	2740.200	120.83	-39.49	6.91E+01
07:40	2800.200	120.85	-39.51	7.06E+01
08:40	2860.300	121.82	-40.48	7.21E+01
09:40	2920.300	121.76	-40.42	7.36E+01
10:40	2980.300	121.85	-40.51	7.51E+01
11:40	3040.200	121.89	-40.55	7.66E+01
12:40	3100.200	121.90	-40.56	7.81E+01
13:40	3160.300	121.95	-40.61	7.96E+01
14:40	3220.300	122.02	-40.68	8.12E+01
15:40	3280.200	122.05	-40.71	8.27E+01
16:40	3340.200	122.25	-40.91	8.42E+01
17:40	3400.300	122.16	-40.82	8.57E+01
18:40	3460.300	122.43	-41.09	8.72E+01
19:40	3520.300	122.39	-41.05	8.87E+01
20:40	3580.200	122.42	-41.08	9.02E+01
21:40	3640.200	122.55	-41.21	9.17E+01
22:40	3700.200	122.52	-41.18	9.32E+01
23:40	3760.200	122.68	-41.34	9.48E+01
00:40	3820.200	122.73	-41.39	9.63E+01
01:40	3880.200	122.88	-41.54	9.78E+01
02:40	3940.200	122.96	-41.62	9.93E+01
03:40	4000.200	122.93	-41.59	1.01E+02
04:40	4060.200	123.05	-41.71	1.02E+02
05:40	4120.200	124.06	-42.72	1.04E+02
06:40	4180.200	123.35	-42.01	1.05E+02
07:40	4240.300	123.35	-42.01	1.07E+02
08:40	4300.300	123.25	-41.91	1.08E+02
09:40	4360.700	123.33	-41.99	1.10E+02
10:40	4420.300	123.19	-41.85	1.11E+02
11:40	4480.300	123.21	-41.87	1.13E+02
12:40	4540.300	123.86	-42.52	1.14E+02
13:40	4600.300	123.93	-42.59	1.16E+02
14:40	4660.300	123.85	-42.51	1.17E+02
15:40	4720.300	123.91	-42.57	1.19E+02
16:40	4780.300	123.93	-42.59	1.20E+02
17:40	4840.300	121.68	-40.34	1.22E+02
18:40	4900.300	123.21	-41.87	1.23E+02
19:40	4960.300	123.29	-41.95	1.25E+02
20:40	5020.300	123.43	-42.09	1.27E+02
21:40	5080.300	123.35	-42.01	1.28E+02
22:40	5140.300	123.42	-42.08	1.30E+02
23:40	5200.300	123.46	-42.12	1.31E+02
00:40	5260.300	123.55	-42.21	1.33E+02
01:40	5320.300	123.59	-42.25	1.34E+02

02:40	5380.300	123.59	-42.25	1.36E+02
03:40	5440.300	123.66	-42.32	1.37E+02
04:40	5500.300	123.72	-42.38	1.39E+02
05:40	5560.300	123.76	-42.42	1.40E+02
06:40	5620.300	123.78	-42.44	1.42E+02
07:40	5680.300	123.79	-42.45	1.43E+02
08:40	5740.300	123.92	-42.58	1.45E+02
09:40	5800.300	123.86	-42.52	1.46E+02
10:40	5860.300	123.92	-42.58	1.48E+02
11:40	5920.300	123.92	-42.58	1.49E+02
12:40	5980.300	123.89	-42.55	1.51E+02
13:40	6040.300	123.88	-42.54	1.52E+02
14:40	6100.300	123.99	-42.65	1.54E+02
15:40	6160.500	123.89	-42.55	1.55E+02
16:40	6220.300	124.02	-42.68	1.57E+02
17:40	6280.300	124.05	-42.71	1.58E+02
18:40	6340.300	124.12	-42.78	1.60E+02
19:40	6400.400	124.18	-42.84	1.61E+02
20:40	6460.200	124.21	-42.87	1.63E+02
21:40	6520.200	124.16	-42.82	1.64E+02
22:40	6580.300	124.31	-42.97	1.66E+02
23:40	6640.300	124.34	-43.00	1.67E+02
00:40	6700.300	124.29	-42.95	1.69E+02
01:40	6760.300	124.36	-43.02	1.70E+02
02:40	6820.300	124.36	-43.02	1.72E+02
03:40	6880.300	124.39	-43.05	1.73E+02
04:40	6940.300	124.39	-43.05	1.75E+02
05:40	7000.300	124.49	-43.15	1.76E+02
06:40	7060.300	124.58	-43.24	1.78E+02
07:40	7120.300	124.71	-43.37	1.79E+02
08:40	7180.300	124.18	-42.84	1.81E+02
09:40	7240.300	124.21	-42.87	1.82E+02
10:40	7300.300	124.65	-43.31	1.84E+02
11:40	7360.300	124.64	-43.30	1.85E+02
12:40	7420.300	124.58	-43.24	1.87E+02
13:40	7480.300	124.55	-43.21	1.89E+02
14:40	7540.300	124.58	-43.24	1.90E+02
15:40	7600.300	124.51	-43.17	1.92E+02
16:40	7660.300	124.53	-43.19	1.93E+02
17:40	7720.300	124.52	-43.18	1.95E+02
18:40	7780.200	124.56	-43.22	1.96E+02
19:40	7840.200	124.62	-43.28	1.98E+02
20:40	7900.300	124.73	-43.39	1.99E+02
21:40	7960.300	124.78	-43.44	2.01E+02
22:40	8020.300	124.68	-43.34	2.02E+02
23:40	8080.300	124.84	-43.50	2.04E+02
00:40	8140.300	124.96	-43.62	2.05E+02
01:40	8200.300	125.06	-43.72	2.07E+02
02:40	8260.300	125.12	-43.78	2.08E+02
03:40	8320.300	125.03	-43.69	2.10E+02
04:40	8380.300	124.94	-43.60	2.11E+02
05:40	8440.300	125.12	-43.78	2.13E+02
06:40	8500.300	125.18	-43.84	2.14E+02
07:40	8560.200	124.98	-43.64	2.16E+02
08:40	8620.300	125.02	-43.68	2.17E+02
09:00	8640.600	125.08	-43.74	2.18E+02

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-1 INPUT 1
RADIUS: 0.166 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 81.34 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
10:25	8725.000	124.97	-43.63	2.20E+02
10:35	8735.071	124.81	-43.47	2.20E+02
10:45	8745.070	124.96	-43.62	2.20E+02
10:55	8755.072	125.08	-43.74	2.21E+02
11:05	8765.072	125.11	-43.77	2.21E+02
11:15	8775.072	125.00	-43.66	2.21E+02
11:25	8785.072	124.90	-43.56	2.21E+02
11:35	8795.072	124.88	-43.54	2.22E+02
11:45	8805.072	125.07	-43.73	2.22E+02
11:55	8815.102	125.08	-43.74	2.22E+02
12:05	8825.090	124.87	-43.53	2.22E+02
12:15	8835.090	124.98	-43.64	2.23E+02
12:25	8845.090	122.30	-40.96	2.23E+02
12:35	8855.090	125.46	-44.12	2.23E+02
12:45	8865.090	125.54	-44.20	2.23E+02
12:55	8875.120	125.64	-44.30	2.24E+02
13:04	8884.970	125.57	-44.23	2.24E+02
13:14	8894.970	124.76	-43.42	2.24E+02
13:25	8904.970	124.51	-43.17	2.24E+02
13:34	8914.970	124.57	-43.23	2.25E+02
13:45	8924.970	124.48	-43.14	2.25E+02
13:54	8934.970	124.40	-43.06	2.25E+02
14:05	8944.970	124.41	-43.07	2.25E+02
14:14	8955.020	124.44	-43.10	2.26E+02
14:25	8965.080	124.53	-43.19	2.26E+02
14:35	8975.080	124.53	-43.19	2.26E+02
14:45	8985.080	125.63	-44.29	2.26E+02
14:55	8995.080	125.69	-44.35	2.27E+02
15:05	9005.080	125.79	-44.45	2.27E+02
15:15	9015.080	125.38	-44.04	2.27E+02
15:25	9025.080	125.40	-44.06	2.27E+02
15:35	9035.080	125.43	-44.09	2.28E+02
15:45	9045.080	125.41	-44.07	2.28E+02
15:55	9055.080	125.31	-43.97	2.28E+02
16:04	9065.020	125.41	-44.07	2.28E+02
16:15	9075.020	125.47	-44.13	2.29E+02
16:25	9084.970	125.77	-44.43	2.29E+02
16:35	9095.080	125.83	-44.49	2.29E+02
16:45	9105.080	125.73	-44.39	2.29E+02
16:55	9115.080	125.79	-44.45	2.30E+02

ADJUSTED DATA

17:05	9125.080	125.69	-44.35	2.30E+02
17:15	9135.080	125.86	-44.52	2.30E+02
17:25	9145.080	125.74	-44.40	2.30E+02
17:35	9155.080	125.73	-44.39	2.31E+02
17:45	9165.080	125.80	-44.46	2.31E+02
17:55	9175.080	125.87	-44.53	2.31E+02
18:05	9185.080	125.74	-44.40	2.31E+02
18:15	9195.080	125.69	-44.35	2.32E+02
18:25	9205.080	123.61	-42.27	2.32E+02
18:35	9215.080	125.67	-44.33	2.32E+02
18:45	9225.080	125.51	-44.17	2.32E+02
18:55	9235.080	125.44	-44.10	2.33E+02
19:05	9245.080	125.64	-44.30	2.33E+02
19:15	9255.080	125.43	-44.09	2.33E+02
19:25	9265.080	125.58	-44.24	2.33E+02
19:35	9275.070	125.57	-44.23	2.34E+02
19:45	9285.080	125.47	-44.13	2.34E+02
19:55	9295.080	125.63	-44.29	2.34E+02
20:05	9305.080	125.48	-44.14	2.34E+02
20:15	9315.080	125.57	-44.23	2.35E+02
20:25	9325.080	125.66	-44.32	2.35E+02
20:35	9335.080	125.70	-44.36	2.35E+02
20:45	9345.080	125.61	-44.27	2.36E+02
20:55	9355.080	125.58	-44.24	2.36E+02
21:05	9365.080	125.48	-44.14	2.36E+02
21:15	9375.080	125.50	-44.16	2.36E+02
21:25	9385.080	125.46	-44.12	2.37E+02
21:35	9395.080	125.69	-44.35	2.37E+02
21:45	9405.080	125.70	-44.36	2.37E+02
21:55	9415.080	125.67	-44.33	2.37E+02
22:05	9425.080	125.74	-44.40	2.38E+02
22:15	9435.080	125.71	-44.37	2.38E+02
22:25	9445.080	125.76	-44.42	2.38E+02
22:35	9455.080	125.73	-44.39	2.38E+02
22:45	9465.080	125.80	-44.46	2.39E+02
22:54	9475.020	125.76	-44.42	2.39E+02
23:05	9485.020	125.69	-44.35	2.39E+02
23:14	9495.020	125.83	-44.49	2.39E+02
23:25	9505.020	125.93	-44.59	2.40E+02
23:34	9515.020	125.83	-44.49	2.40E+02
23:45	9525.020	125.84	-44.50	2.40E+02
23:55	9535.020	125.81	-44.47	2.40E+02
00:05	9545.020	125.84	-44.50	2.41E+02
00:15	9555.020	125.86	-44.52	2.41E+02
00:25	9565.030	125.89	-44.55	2.41E+02
00:35	9575.030	125.86	-44.52	2.41E+02
00:44	9585.030	125.90	-44.56	2.42E+02
00:55	9595.030	125.87	-44.53	2.42E+02
01:04	9605.030	125.87	-44.53	2.42E+02
01:15	9615.030	125.93	-44.59	2.42E+02
01:25	9625.030	125.93	-44.59	2.43E+02
01:35	9635.030	125.96	-44.62	2.43E+02
01:45	9645.030	125.93	-44.59	2.43E+02
01:55	9655.030	125.93	-44.59	2.43E+02
02:05	9665.030	126.01	-44.67	2.44E+02
02:14	9675.030	125.94	-44.60	2.44E+02

ADJUSTED DATA

02:25	9685.030	125.94	-44.60	2.44E+02
02:34	9695.030	125.91	-44.57	2.44E+02
02:45	9705.030	125.89	-44.55	2.45E+02
02:55	9715.030	125.91	-44.57	2.45E+02
03:04	9725.000	125.91	-44.57	2.45E+02
03:15	9735.000	125.96	-44.62	2.45E+02
03:24	9745.000	125.99	-44.65	2.46E+02
03:35	9755.100	125.93	-44.59	2.46E+02
03:44	9765.000	125.97	-44.63	2.46E+02
03:55	9775.000	125.97	-44.63	2.46E+02
04:04	9785.000	126.01	-44.67	2.47E+02
04:15	9795.000	125.67	-44.33	2.47E+02
04:25	9805.000	125.79	-44.45	2.47E+02
04:34	9815.000	125.74	-44.40	2.47E+02
04:45	9825.000	125.51	-44.17	2.48E+02
04:54	9835.000	125.54	-44.20	2.48E+02
05:05	9845.000	125.71	-44.37	2.48E+02
05:14	9855.000	125.66	-44.32	2.48E+02
05:25	9865.000	126.07	-44.73	2.49E+02
05:34	9875.000	126.07	-44.73	2.49E+02
05:45	9885.000	126.07	-44.73	2.49E+02
05:55	9895.000	126.10	-44.76	2.49E+02
06:04	9905.000	126.09	-44.75	2.50E+02
06:15	9915.000	125.71	-44.37	2.50E+02
06:24	9925.000	125.73	-44.39	2.50E+02
06:35	9935.000	125.84	-44.50	2.50E+02
06:44	9945.000	126.06	-44.72	2.51E+02
06:55	9955.000	126.04	-44.70	2.51E+02
07:05	9965.100	126.07	-44.73	2.51E+02
07:15	9975.100	126.00	-44.66	2.51E+02
07:25	9985.100	126.01	-44.67	2.52E+02
07:35	9995.100	126.00	-44.66	2.52E+02
07:45	10005.100	126.01	-44.67	2.52E+02
07:55	10015.100	126.04	-44.70	2.52E+02
08:05	10025.100	126.14	-44.80	2.53E+02
08:15	10035.100	126.10	-44.76	2.53E+02
08:25	10045.100	126.16	-44.82	2.53E+02
08:35	10055.100	126.16	-44.82	2.53E+02
08:45	10065.100	126.10	-44.76	2.54E+02
08:55	10075.000	126.07	-44.73	2.54E+02
09:04	10085.000	126.11	-44.77	2.54E+02
09:15	10095.000	126.16	-44.82	2.54E+02
09:24	10105.000	126.17	-44.83	2.55E+02
09:28	10108.200	126.17	-44.83	2.55E+02

TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-1 INPUT 1
RADIUS: 0.166 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 81.34 FEET
WATER STOP LEVEL: 127.32 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t
11:10	0.017	124.36	2.96	43.02	4.28E-04	6.01E+05
11:10	0.034	123.90	3.42	42.56	8.57E-04	3.00E+05
11:10	0.050	123.43	3.89	42.09	1.26E-03	2.04E+05
11:10	0.067	122.99	4.33	41.65	1.69E-03	1.52E+05
11:10	0.084	122.53	4.79	41.19	2.12E-03	1.22E+05
11:10	0.100	122.10	5.22	40.76	2.52E-03	1.02E+05
11:10	0.117	121.66	5.66	40.32	2.95E-03	8.73E+04
11:10	0.134	121.23	6.09	39.89	3.38E-03	7.62E+04
11:10	0.150	120.81	6.51	39.47	3.78E-03	6.81E+04
11:10	0.167	120.41	6.91	39.07	4.21E-03	6.11E+04
11:10	0.257	118.31	9.01	36.97	6.48E-03	3.97E+04
11:10	0.341	116.53	10.79	35.19	8.59E-03	2.99E+04
11:10	0.424	114.88	12.44	33.54	1.07E-02	2.41E+04
11:10	0.507	113.35	13.97	32.01	1.28E-02	2.01E+04
11:10	0.591	111.94	15.38	30.60	1.49E-02	1.73E+04
11:10	0.674	110.65	16.67	29.31	1.70E-02	1.52E+04
11:10	0.757	109.46	17.86	28.12	1.91E-02	1.35E+04
11:10	0.841	108.37	18.95	27.03	2.12E-02	1.21E+04
11:10	0.924	107.39	19.93	26.05	2.33E-02	1.11E+04
11:11	1.007	106.47	20.85	25.13	2.54E-02	1.01E+04
11:11	1.413	103.07	24.25	21.73	3.56E-02	7.23E+03
11:11	1.747	101.21	26.11	19.87	4.40E-02	5.85E+03
11:12	2.080	99.97	27.35	18.63	5.24E-02	4.91E+03
11:12	2.413	99.11	28.21	17.77	6.08E-02	4.23E+03
11:12	2.747	98.52	28.80	17.18	6.92E-02	3.72E+03
11:13	3.080	98.10	29.22	16.76	7.76E-02	3.32E+03
11:13	3.413	97.80	29.52	16.46	8.60E-02	2.99E+03
11:13	3.747	97.56	29.76	16.22	9.44E-02	2.73E+03
11:14	4.080	97.39	29.93	16.05	1.03E-01	2.50E+03
11:14	4.413	97.25	30.07	15.91	1.11E-01	2.31E+03
11:14	4.747	97.14	30.18	15.80	1.20E-01	2.15E+03
11:15	5.080	97.04	30.28	15.70	1.28E-01	2.01E+03
11:15	5.413	96.96	30.36	15.62	1.36E-01	1.89E+03
11:15	5.747	96.88	30.44	15.54	1.45E-01	1.78E+03
11:16	6.080	96.82	30.50	15.48	1.53E-01	1.68E+03
11:16	6.413	96.75	30.57	15.41	1.62E-01	1.59E+03
11:16	6.747	96.71	30.61	15.37	1.70E-01	1.51E+03
11:17	7.080	96.65	30.67	15.31	1.78E-01	1.44E+03
11:17	7.413	96.61	30.71	15.27	1.87E-01	1.38E+03
11:17	7.747	96.56	30.76	15.22	1.95E-01	1.32E+03
11:18	8.080	96.52	30.80	15.18	2.04E-01	1.26E+03
11:18	8.413	96.48	30.84	15.14	2.12E-01	1.21E+03

11:18	8.747	96.44	30.88	15.10	2.20E-01	1.17E+03
11:19	9.080	96.41	30.91	15.07	2.29E-01	1.13E+03
11:19	9.413	96.38	30.94	15.04	2.37E-01	1.09E+03
11:19	9.747	96.34	30.98	15.00	2.46E-01	1.05E+03
11:20	10.080	96.31	31.01	14.97	2.54E-01	1.01E+03
11:22	12.115	96.14	31.18	14.80	3.05E-01	8.44E+02
11:24	14.115	95.99	31.33	14.65	3.56E-01	7.24E+02
11:26	16.115	95.88	31.44	14.54	4.06E-01	6.35E+02
11:28	18.115	95.76	31.56	14.42	4.57E-01	5.65E+02
11:30	20.115	95.68	31.64	14.34	5.07E-01	5.09E+02
11:32	22.115	95.59	31.73	14.25	5.57E-01	4.63E+02
11:34	24.115	95.52	31.80	14.18	6.08E-01	4.24E+02
11:36	26.115	95.45	31.87	14.11	6.58E-01	3.92E+02
11:38	28.115	95.38	31.94	14.04	7.09E-01	3.64E+02
11:40	30.115	95.32	32.00	13.98	7.59E-01	3.40E+02
11:42	32.115	95.26	32.06	13.92	8.09E-01	3.19E+02
11:44	34.115	95.21	32.11	13.87	8.60E-01	3.00E+02
11:46	36.115	95.15	32.17	13.81	9.10E-01	2.84E+02
11:48	38.115	95.11	32.21	13.77	9.61E-01	2.69E+02
11:50	40.115	95.06	32.26	13.72	1.01E+00	2.56E+02
11:52	42.115	95.01	32.31	13.67	1.06E+00	2.43E+02
11:54	44.115	94.96	32.36	13.62	1.11E+00	2.32E+02
11:56	46.115	94.94	32.38	13.60	1.16E+00	2.22E+02
11:58	48.115	94.88	32.44	13.54	1.21E+00	2.13E+02
12:00	50.115	94.83	32.49	13.49	1.26E+00	2.05E+02
12:02	52.115	94.81	32.51	13.47	1.31E+00	1.97E+02
12:04	54.115	94.76	32.56	13.42	1.36E+00	1.90E+02
12:06	56.115	94.73	32.59	13.39	1.41E+00	1.83E+02
12:08	58.115	94.71	32.61	13.37	1.46E+00	1.77E+02
12:10	60.115	94.66	32.66	13.32	1.51E+00	1.71E+02
12:12	62.102	94.64	32.68	13.30	1.57E+00	1.65E+02
12:14	64.492	94.59	32.73	13.25	1.63E+00	1.59E+02
12:16	66.188	94.56	32.76	13.22	1.67E+00	1.55E+02
12:18	68.188	94.53	32.79	13.19	1.72E+00	1.51E+02
12:20	70.188	94.51	32.81	13.17	1.77E+00	1.46E+02
12:22	72.188	94.48	32.84	13.14	1.82E+00	1.42E+02
12:24	74.188	94.45	32.87	13.11	1.87E+00	1.39E+02
12:26	76.188	94.42	32.90	13.08	1.92E+00	1.35E+02
12:28	78.188	94.39	32.93	13.05	1.97E+00	1.32E+02
12:30	80.188	94.36	32.96	13.02	2.02E+00	1.28E+02
12:32	82.188	94.33	32.99	12.99	2.07E+00	1.25E+02
12:34	84.188	94.31	33.01	12.97	2.12E+00	1.22E+02
12:36	86.188	94.28	33.04	12.94	2.17E+00	1.19E+02
12:38	88.188	94.26	33.06	12.92	2.22E+00	1.17E+02
12:40	90.188	94.22	33.10	12.88	2.27E+00	1.14E+02
12:42	92.188	94.21	33.11	12.87	2.32E+00	1.12E+02
12:44	94.188	94.18	33.14	12.84	2.37E+00	1.09E+02
12:46	96.188	94.15	33.17	12.81	2.42E+00	1.07E+02
12:48	98.188	94.12	33.20	12.78	2.47E+00	1.05E+02
13:10	120.110	93.88	33.44	12.54	3.03E+00	8.60E+01
13:30	140.110	93.66	33.66	12.32	3.53E+00	7.39E+01
13:50	160.120	93.49	33.83	12.15	4.04E+00	6.48E+01
14:10	180.120	93.32	34.00	11.98	4.54E+00	5.77E+01
14:30	200.120	93.15	34.17	11.81	5.04E+00	5.20E+01
14:50	220.120	92.99	34.33	11.65	5.55E+00	4.74E+01
15:10	240.120	92.85	34.47	11.51	6.05E+00	4.35E+01

15:30	260.120	92.73	34.59	11.39	6.56E+00	4.03E+01
15:50	280.120	92.59	34.73	11.25	7.06E+00	3.75E+01
16:10	300.120	92.48	34.84	11.14	7.56E+00	3.50E+01
16:30	320.050	92.36	34.96	11.02	8.07E+00	3.29E+01
16:49	340.050	92.25	35.07	10.91	8.57E+00	3.10E+01
17:10	360.050	92.15	35.17	10.81	9.07E+00	2.94E+01
17:30	380.050	92.05	35.27	10.71	9.58E+00	2.79E+01
17:50	400.050	91.95	35.37	10.61	1.01E+01	2.65E+01
18:10	420.050	91.85	35.47	10.51	1.06E+01	2.53E+01
18:30	440.050	91.76	35.56	10.42	1.11E+01	2.42E+01
18:50	460.050	91.68	35.64	10.34	1.16E+01	2.32E+01
19:10	480.050	91.59	35.73	10.25	1.21E+01	2.23E+01
19:30	500.050	91.52	35.80	10.18	1.26E+01	2.14E+01
19:49	520.050	91.43	35.89	10.09	1.31E+01	2.06E+01
20:10	540.050	91.36	35.96	10.02	1.36E+01	1.99E+01
20:30	560.050	91.29	36.03	9.95	1.41E+01	1.92E+01
20:50	580.050	91.22	36.10	9.88	1.46E+01	1.86E+01
21:10	600.050	91.15	36.17	9.81	1.51E+01	1.80E+01
21:30	620.050	91.07	36.25	9.73	1.56E+01	1.75E+01
21:50	640.050	91.00	36.32	9.66	1.61E+01	1.70E+01
22:10	660.050	90.93	36.39	9.59	1.66E+01	1.65E+01
22:30	680.050	90.87	36.45	9.53	1.71E+01	1.60E+01
22:49	700.050	90.82	36.50	9.48	1.76E+01	1.56E+01
23:10	720.050	90.76	36.56	9.42	1.81E+01	1.52E+01
23:30	740.050	90.70	36.62	9.36	1.87E+01	1.48E+01
23:50	760.100	90.63	36.69	9.29	1.92E+01	1.44E+01
00:10	780.100	90.59	36.73	9.25	1.97E+01	1.41E+01
00:30	800.100	90.53	36.79	9.19	2.02E+01	1.38E+01
00:50	820.100	90.46	36.86	9.12	2.07E+01	1.35E+01
01:10	840.100	90.40	36.92	9.06	2.12E+01	1.32E+01
01:30	860.100	90.36	36.96	9.02	2.17E+01	1.29E+01
01:50	880.100	90.30	37.02	8.96	2.22E+01	1.26E+01
02:10	900.100	90.25	37.07	8.91	2.27E+01	1.23E+01
02:30	920.100	90.20	37.12	8.86	2.32E+01	1.21E+01
02:50	940.100	90.14	37.18	8.80	2.37E+01	1.19E+01
03:10	960.100	90.10	37.22	8.76	2.42E+01	1.16E+01
03:30	980.100	90.04	37.28	8.70	2.47E+01	1.14E+01
03:50	1000.100	90.00	37.32	8.66	2.52E+01	1.12E+01
04:50	1060.300	89.86	37.46	8.52	2.67E+01	1.06E+01
05:50	1120.300	89.71	37.61	8.37	2.82E+01	1.01E+01
06:50	1180.300	89.59	37.73	8.25	2.97E+01	9.65E+00
07:50	1240.300	89.46	37.86	8.12	3.13E+01	9.23E+00
08:50	1300.300	89.34	37.98	8.00	3.28E+01	8.85E+00
09:50	1360.300	89.24	38.08	7.90	3.43E+01	8.51E+00
10:50	1420.300	89.13	38.19	7.79	3.58E+01	8.19E+00
11:50	1480.300	89.03	38.29	7.69	3.73E+01	7.90E+00
12:50	1540.300	88.91	38.41	7.57	3.88E+01	7.63E+00
13:50	1600.300	88.82	38.50	7.48	4.03E+01	7.38E+00
14:50	1660.300	88.71	38.61	7.37	4.18E+01	7.15E+00
15:50	1720.100	88.61	38.71	7.27	4.33E+01	6.94E+00
16:50	1780.100	88.53	38.79	7.19	4.49E+01	6.74E+00
17:50	1840.100	88.43	38.89	7.09	4.64E+01	6.55E+00
18:50	1900.100	88.34	38.98	7.00	4.79E+01	6.37E+00
19:50	1960.100	88.24	39.08	6.90	4.94E+01	6.21E+00
20:50	2020.100	88.17	39.15	6.83	5.09E+01	6.05E+00
21:50	2080.100	88.09	39.23	6.75	5.24E+01	5.91E+00

22:50	2140.100	88.01	39.31	6.67	5.39E+01	5.77E+00
23:50	2200.100	87.93	39.39	6.59	5.54E+01	5.64E+00
00:50	2260.100	87.86	39.46	6.52	5.70E+01	5.52E+00
01:50	2320.100	87.78	39.54	6.44	5.85E+01	5.40E+00
02:50	2380.100	87.71	39.61	6.37	6.00E+01	5.29E+00
03:50	2440.100	87.63	39.69	6.29	6.15E+01	5.18E+00
04:50	2500.100	87.56	39.76	6.22	6.30E+01	5.08E+00
05:50	2560.100	87.50	39.82	6.16	6.45E+01	4.99E+00
06:50	2620.100	87.43	39.89	6.09	6.60E+01	4.90E+00
07:50	2680.100	87.37	39.95	6.03	6.75E+01	4.81E+00
08:50	2740.200	87.30	40.02	5.96	6.91E+01	4.73E+00
09:50	2800.200	87.24	40.08	5.90	7.06E+01	4.65E+00
10:50	2860.200	87.18	40.14	5.84	7.21E+01	4.57E+00
11:50	2920.100	87.13	40.19	5.79	7.36E+01	4.50E+00
12:50	2980.200	87.07	40.25	5.73	7.51E+01	4.43E+00
13:50	3040.200	87.00	40.32	5.66	7.66E+01	4.36E+00
14:50	3100.200	86.94	40.38	5.60	7.81E+01	4.29E+00
15:50	3160.200	86.88	40.44	5.54	7.96E+01	4.23E+00
16:50	3220.200	86.83	40.49	5.49	8.12E+01	4.17E+00
17:50	3280.200	86.77	40.55	5.43	8.27E+01	4.11E+00
18:50	3340.200	86.71	40.61	5.37	8.42E+01	4.06E+00
19:50	3400.200	86.67	40.65	5.33	8.57E+01	4.00E+00
20:50	3460.200	86.61	40.71	5.27	8.72E+01	3.95E+00
21:50	3520.200	86.57	40.75	5.23	8.87E+01	3.90E+00
22:50	3580.200	86.53	40.79	5.19	9.02E+01	3.85E+00
23:50	3640.200	86.47	40.85	5.13	9.17E+01	3.80E+00
00:50	3700.200	86.43	40.89	5.09	9.32E+01	3.76E+00
01:50	3760.200	86.38	40.94	5.04	9.48E+01	3.72E+00
02:50	3820.200	86.33	40.99	4.99	9.63E+01	3.67E+00
03:50	3880.200	86.28	41.04	4.94	9.78E+01	3.63E+00
04:50	3940.200	86.23	41.09	4.89	9.93E+01	3.59E+00
05:50	4000.200	86.18	41.14	4.84	1.01E+02	3.55E+00
06:50	4060.200	86.14	41.18	4.80	1.02E+02	3.51E+00
07:50	4120.200	86.10	41.22	4.76	1.04E+02	3.48E+00
08:50	4180.200	86.05	41.27	4.71	1.05E+02	3.44E+00
09:50	4240.200	86.03	41.29	4.69	1.07E+02	3.41E+00
10:50	4300.200	85.98	41.34	4.64	1.08E+02	3.37E+00
11:04	4314.800	85.97	41.35	4.63	1.09E+02	3.37E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 11 INPUT 2
RADIUS: 427.782 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 78.42 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
09:00	0.000	78.42	0.00	0.00E+00
09:00	0.017	-99.99	178.41	6.45E-11
09:00	0.034	-99.99	178.41	1.29E-10
09:00	0.050	-99.99	178.41	1.90E-10
09:00	0.067	-99.99	178.41	2.54E-10
09:00	0.084	-99.99	178.41	3.19E-10
09:00	0.100	-99.99	178.41	3.79E-10
09:00	0.117	-99.99	178.41	4.44E-10
09:00	0.134	-99.99	178.41	5.09E-10
09:00	0.150	-99.99	178.41	5.69E-10
09:00	0.167	-99.99	178.41	6.34E-10
09:00	0.257	78.42	0.00	9.75E-10
09:00	0.340	78.42	0.00	1.29E-09
09:00	0.424	78.42	0.00	1.61E-09
09:00	0.507	78.42	0.00	1.92E-09
09:00	0.590	78.42	0.00	2.24E-09
09:00	0.674	78.42	0.00	2.56E-09
09:00	0.757	78.42	0.00	2.87E-09
09:00	0.840	78.42	0.00	3.19E-09
09:00	0.924	78.42	0.00	3.51E-09
09:01	1.007	78.42	0.00	3.82E-09
09:01	1.414	78.42	0.00	5.37E-09
09:01	1.748	78.42	0.00	6.63E-09
09:02	2.081	78.42	0.00	7.90E-09
09:02	2.414	78.42	0.00	9.16E-09
09:02	2.748	78.42	0.00	1.04E-08
09:03	3.081	78.42	0.00	1.17E-08
09:03	3.415	78.42	0.00	1.30E-08
09:03	3.748	78.42	0.00	1.42E-08
09:04	4.081	78.42	0.00	1.55E-08
09:04	4.414	78.42	0.00	1.68E-08
09:04	4.748	78.42	0.00	1.80E-08
09:05	5.081	78.42	0.00	1.93E-08
09:05	5.414	78.42	0.00	2.05E-08
09:05	5.748	78.42	0.00	2.18E-08
09:06	6.081	78.42	0.00	2.31E-08
09:06	6.415	78.42	0.00	2.43E-08
09:06	6.748	78.43	-0.01	2.56E-08
09:07	7.081	78.43	-0.01	2.69E-08
09:07	7.415	78.43	-0.01	2.81E-08
09:07	7.748	78.43	-0.01	2.94E-08

09:08	8.081	78.43	-0.01	3.07E-08
09:08	8.415	78.43	-0.01	3.19E-08
09:08	8.748	78.43	-0.01	3.32E-08
09:09	9.081	78.43	-0.01	3.45E-08
09:09	9.414	78.43	-0.01	3.57E-08
09:09	9.748	78.43	-0.01	3.70E-08
09:10	10.081	78.43	-0.01	3.83E-08
09:12	12.108	78.44	-0.02	4.59E-08
09:14	14.152	78.44	-0.02	5.37E-08
09:16	16.152	78.46	-0.04	6.13E-08
09:18	18.152	78.47	-0.05	6.89E-08
09:20	20.152	78.49	-0.07	7.65E-08
09:22	22.152	78.50	-0.08	8.41E-08
09:24	24.152	78.52	-0.10	9.17E-08
09:26	26.152	78.54	-0.12	9.92E-08
09:28	28.215	78.57	-0.15	1.07E-07
09:30	30.197	78.59	-0.17	1.15E-07
09:32	32.197	78.61	-0.19	1.22E-07
09:34	34.197	78.64	-0.22	1.30E-07
09:36	36.197	78.66	-0.24	1.37E-07
09:38	38.197	78.69	-0.27	1.45E-07
09:40	40.197	78.71	-0.29	1.53E-07
09:42	42.197	78.73	-0.31	1.60E-07
09:44	44.197	78.76	-0.34	1.68E-07
09:46	46.197	78.78	-0.36	1.75E-07
09:48	48.197	78.81	-0.39	1.83E-07
09:50	50.197	78.83	-0.41	1.90E-07
09:52	52.197	78.86	-0.44	1.98E-07
09:54	54.197	78.88	-0.46	2.06E-07
09:56	56.217	78.91	-0.49	2.13E-07
09:58	58.100	78.93	-0.51	2.20E-07
10:00	60.245	78.95	-0.53	2.29E-07
10:02	62.245	78.98	-0.56	2.36E-07
10:04	64.245	79.00	-0.58	2.44E-07
10:06	66.245	79.03	-0.61	2.51E-07
10:08	68.245	79.05	-0.63	2.59E-07
10:10	70.245	79.07	-0.65	2.67E-07
10:12	72.245	79.10	-0.68	2.74E-07
10:14	74.245	79.12	-0.70	2.82E-07
10:16	76.245	79.14	-0.72	2.89E-07
10:18	78.245	79.16	-0.74	2.97E-07
10:20	80.245	79.19	-0.77	3.05E-07
10:22	82.245	79.21	-0.79	3.12E-07
10:24	84.245	79.23	-0.81	3.20E-07
10:26	86.245	79.25	-0.83	3.27E-07
10:28	88.245	79.28	-0.86	3.35E-07
10:30	90.245	79.30	-0.88	3.42E-07
10:32	92.245	79.32	-0.90	3.50E-07
10:34	94.245	79.34	-0.92	3.58E-07
10:36	96.245	79.37	-0.95	3.65E-07
10:38	98.245	79.39	-0.97	3.73E-07
11:00	120.210	79.61	-1.19	4.56E-07
11:20	140.210	79.82	-1.40	5.32E-07
11:40	160.210	79.99	-1.57	6.08E-07
12:00	180.220	80.16	-1.74	6.84E-07
12:20	200.220	80.32	-1.90	7.60E-07

12:40	220.220	80.47	-2.05	8.36E-07
13:00	240.220	80.61	-2.19	9.12E-07
13:20	260.220	80.74	-2.32	9.87E-07
13:40	280.230	80.85	-2.43	1.06E-06
14:00	300.230	80.97	-2.55	1.14E-06
14:20	320.230	81.07	-2.65	1.22E-06
14:40	340.180	81.16	-2.74	1.29E-06
15:00	360.100	81.25	-2.83	1.37E-06
15:20	380.100	81.33	-2.91	1.44E-06
15:40	400.100	81.40	-2.98	1.52E-06
16:00	420.170	81.47	-3.05	1.59E-06
16:20	440.250	81.54	-3.12	1.67E-06
16:40	460.200	81.61	-3.19	1.75E-06
17:00	480.170	81.67	-3.25	1.82E-06
17:20	500.170	81.73	-3.31	1.90E-06
17:40	520.130	81.80	-3.38	1.97E-06
18:00	540.120	81.86	-3.44	2.05E-06
18:20	560.220	81.93	-3.51	2.13E-06
18:40	580.080	82.03	-3.61	2.20E-06
19:00	600.220	82.11	-3.69	2.28E-06
19:20	620.230	82.19	-3.77	2.35E-06
19:40	640.220	82.27	-3.85	2.43E-06
20:00	660.220	82.34	-3.92	2.51E-06
20:20	680.130	82.41	-3.99	2.58E-06
20:40	700.120	82.48	-4.06	2.66E-06
21:00	720.230	82.54	-4.12	2.73E-06
21:20	740.300	82.61	-4.19	2.81E-06
21:40	760.230	82.67	-4.25	2.88E-06
22:00	780.230	82.74	-4.32	2.96E-06
22:20	800.230	82.80	-4.38	3.04E-06
22:40	820.180	82.86	-4.44	3.11E-06
23:00	840.570	82.92	-4.50	3.19E-06
23:20	860.180	82.97	-4.55	3.26E-06
23:40	880.080	83.03	-4.61	3.34E-06
00:00	900.170	83.09	-4.67	3.42E-06
00:20	920.170	83.14	-4.72	3.49E-06
00:40	940.170	83.19	-4.77	3.57E-06
01:00	960.170	83.25	-4.83	3.64E-06
01:20	980.170	83.30	-4.88	3.72E-06
01:40	1000.200	83.35	-4.93	3.80E-06
02:40	1060.300	83.49	-5.07	4.02E-06
03:40	1120.300	83.63	-5.21	4.25E-06
04:40	1180.300	83.76	-5.34	4.48E-06
05:40	1240.300	83.89	-5.47	4.71E-06
06:40	1300.300	84.01	-5.59	4.93E-06
07:40	1360.200	84.12	-5.70	5.16E-06
08:40	1420.200	84.22	-5.80	5.39E-06
09:40	1480.200	84.33	-5.91	5.62E-06
10:40	1540.200	84.43	-6.01	5.84E-06
11:40	1600.300	84.52	-6.10	6.07E-06
12:40	1660.300	84.59	-6.17	6.30E-06
13:40	1720.200	84.53	-6.11	6.53E-06
14:40	1780.300	84.70	-6.28	6.76E-06
15:40	1840.300	84.78	-6.36	6.98E-06
16:40	1900.300	84.84	-6.42	7.21E-06
17:40	1960.200	84.92	-6.50	7.44E-06

18:40	2020.200	84.98	-6.56	7.67E-06
19:40	2080.200	85.07	-6.65	7.89E-06
20:40	2140.200	85.17	-6.75	8.12E-06
21:40	2200.300	85.25	-6.83	8.35E-06
22:40	2260.300	85.33	-6.91	8.58E-06
23:40	2320.200	85.39	-6.97	8.80E-06
00:40	2380.200	85.47	-7.05	9.03E-06
01:40	2440.200	85.54	-7.12	9.26E-06
02:40	2500.200	85.62	-7.20	9.49E-06
03:40	2560.200	85.70	-7.28	9.72E-06
04:40	2620.200	85.77	-7.35	9.94E-06
05:40	2680.200	85.83	-7.41	1.02E-05
06:40	2740.200	85.89	-7.47	1.04E-05
07:40	2800.200	85.95	-7.53	1.06E-05
08:40	2860.300	86.01	-7.59	1.09E-05
09:40	2920.300	86.10	-7.68	1.11E-05
10:40	2980.300	86.16	-7.74	1.13E-05
11:40	3040.200	86.24	-7.82	1.15E-05
12:40	3100.200	86.31	-7.89	1.18E-05
13:40	3160.300	86.37	-7.95	1.20E-05
14:40	3220.300	86.44	-8.02	1.22E-05
15:40	3280.200	86.51	-8.09	1.24E-05
16:40	3340.200	86.58	-8.16	1.27E-05
17:40	3400.300	86.60	-8.18	1.29E-05
18:40	3460.300	86.67	-8.25	1.31E-05
19:40	3520.300	86.72	-8.30	1.34E-05
20:40	3580.200	86.78	-8.36	1.36E-05
21:40	3640.200	86.84	-8.42	1.38E-05
22:40	3700.200	86.91	-8.49	1.40E-05
23:40	3760.200	86.97	-8.55	1.43E-05
00:40	3820.200	87.02	-8.60	1.45E-05
01:40	3880.200	87.06	-8.64	1.47E-05
02:40	3940.200	87.10	-8.68	1.50E-05
03:40	4000.200	87.15	-8.73	1.52E-05
04:40	4060.200	87.20	-8.78	1.54E-05
05:40	4120.200	87.26	-8.84	1.56E-05
06:40	4180.200	87.31	-8.89	1.59E-05
07:40	4240.300	87.35	-8.93	1.61E-05
08:40	4300.300	87.40	-8.98	1.63E-05
09:40	4360.700	87.46	-9.04	1.65E-05
10:40	4420.300	87.50	-9.08	1.68E-05
11:40	4480.300	87.54	-9.12	1.70E-05
12:40	4540.300	87.58	-9.16	1.72E-05
13:40	4600.300	87.62	-9.20	1.75E-05
14:40	4660.300	87.67	-9.25	1.77E-05
15:40	4720.300	87.69	-9.27	1.79E-05
16:40	4780.300	87.74	-9.32	1.81E-05
17:40	4840.300	87.78	-9.36	1.84E-05
18:40	4900.300	87.78	-9.36	1.86E-05
19:40	4960.300	87.81	-9.39	1.88E-05
20:40	5020.300	87.85	-9.43	1.91E-05
21:40	5080.300	87.88	-9.46	1.93E-05
22:40	5140.300	87.91	-9.49	1.95E-05
23:40	5200.300	87.94	-9.52	1.97E-05
00:40	5260.300	87.97	-9.55	2.00E-05
01:40	5320.300	88.00	-9.58	2.02E-05

02:40	5380.300	88.03	-9.61	2.04E-05
03:40	5440.300	88.06	-9.64	2.06E-05
04:40	5500.300	88.09	-9.67	2.09E-05
05:40	5560.300	88.12	-9.70	2.11E-05
06:40	5620.300	88.15	-9.73	2.13E-05
07:40	5680.300	88.19	-9.77	2.16E-05
08:40	5740.300	88.22	-9.80	2.18E-05
09:40	5800.300	88.25	-9.83	2.20E-05
10:40	5860.300	88.28	-9.86	2.22E-05
11:40	5920.300	88.31	-9.89	2.25E-05
12:40	5980.300	88.32	-9.90	2.27E-05
13:40	6040.300	88.34	-9.92	2.29E-05
14:40	6100.300	88.36	-9.94	2.31E-05
15:40	6160.500	88.38	-9.96	2.34E-05
16:40	6220.300	88.41	-9.99	2.36E-05
17:40	6280.300	88.43	-10.01	2.38E-05
18:40	6340.300	88.46	-10.04	2.41E-05
19:40	6400.400	88.48	-10.06	2.43E-05
20:40	6460.200	88.51	-10.09	2.45E-05
21:40	6520.200	88.54	-10.12	2.47E-05
22:40	6580.300	88.57	-10.15	2.50E-05
23:40	6640.300	88.60	-10.18	2.52E-05
00:40	6700.300	88.62	-10.20	2.54E-05
01:40	6760.300	88.64	-10.22	2.57E-05
02:40	6820.300	88.67	-10.25	2.59E-05
03:40	6880.300	88.69	-10.27	2.61E-05
04:40	6940.300	88.71	-10.29	2.63E-05
05:40	7000.300	88.73	-10.31	2.66E-05
06:40	7060.300	88.75	-10.33	2.68E-05
07:40	7120.300	88.75	-10.33	2.70E-05
08:40	7180.300	88.72	-10.30	2.72E-05
09:40	7240.300	88.65	-10.23	2.75E-05
10:40	7300.300	88.59	-10.17	2.77E-05
11:40	7360.300	88.54	-10.12	2.79E-05
12:40	7420.300	88.51	-10.09	2.82E-05
13:40	7480.300	88.49	-10.07	2.84E-05
14:40	7540.300	88.50	-10.08	2.86E-05
15:40	7600.300	88.52	-10.10	2.88E-05
16:40	7660.300	88.56	-10.14	2.91E-05
17:40	7720.300	88.60	-10.18	2.93E-05
18:40	7780.200	88.64	-10.22	2.95E-05
19:40	7840.200	88.69	-10.27	2.98E-05
20:40	7900.300	88.75	-10.33	3.00E-05
21:40	7960.300	88.80	-10.38	3.02E-05
22:40	8020.300	88.80	-10.38	3.04E-05
23:40	8080.300	88.81	-10.39	3.07E-05
00:40	8140.300	88.81	-10.39	3.09E-05
01:40	8200.300	88.81	-10.39	3.11E-05
02:40	8260.300	88.82	-10.40	3.13E-05
03:40	8320.300	88.81	-10.39	3.16E-05
04:40	8380.300	88.82	-10.40	3.18E-05
05:40	8440.300	88.82	-10.40	3.20E-05
06:40	8500.300	88.82	-10.40	3.23E-05
07:40	8560.200	88.82	-10.40	3.25E-05
08:40	8620.300	88.82	-10.40	3.27E-05
09:00	8640.600	88.82	-10.40	3.28E-05

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI-11 INPUT 2
RADIUS: 427.782 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 78.42 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
10:25	8725.000	88.82	-10.40	3.31E-05
10:35	8735.071	88.82	-10.40	3.31E-05
10:45	8745.070	88.82	-10.40	3.32E-05
10:55	8755.072	88.81	-10.39	3.32E-05
11:05	8765.072	88.81	-10.39	3.33E-05
11:15	8775.072	88.81	-10.39	3.33E-05
11:25	8785.072	88.82	-10.40	3.33E-05
11:35	8795.072	88.81	-10.39	3.34E-05
11:45	8805.072	88.82	-10.40	3.34E-05
11:55	8815.102	88.82	-10.40	3.35E-05
12:05	8825.090	88.82	-10.40	3.35E-05
12:15	8835.090	88.82	-10.40	3.35E-05
12:25	8845.090	88.82	-10.40	3.36E-05
12:35	8855.090	88.82	-10.40	3.36E-05
12:45	8865.090	88.82	-10.40	3.36E-05
12:55	8875.120	88.81	-10.39	3.37E-05
13:04	8884.970	88.81	-10.39	3.37E-05
13:14	8894.970	88.81	-10.39	3.38E-05
13:25	8904.970	88.81	-10.39	3.38E-05
13:34	8914.970	88.82	-10.40	3.38E-05
13:45	8924.970	88.82	-10.40	3.39E-05
13:54	8934.970	88.81	-10.39	3.39E-05
14:05	8944.970	88.82	-10.40	3.39E-05
14:14	8955.020	88.81	-10.39	3.40E-05
14:25	8965.080	88.82	-10.40	3.40E-05
14:35	8975.080	88.81	-10.39	3.41E-05
14:45	8985.080	88.81	-10.39	3.41E-05
14:55	8995.080	88.81	-10.39	3.41E-05
15:05	9005.080	88.81	-10.39	3.42E-05
15:15	9015.080	88.81	-10.39	3.42E-05
15:25	9025.080	88.81	-10.39	3.42E-05
15:35	9035.080	88.81	-10.39	3.43E-05
15:45	9045.080	88.81	-10.39	3.43E-05
15:55	9055.080	88.81	-10.39	3.44E-05
16:04	9065.020	88.81	-10.39	3.44E-05
16:15	9075.020	88.81	-10.39	3.44E-05
16:25	9084.970	88.81	-10.39	3.45E-05
16:35	9095.080	88.81	-10.39	3.45E-05
16:45	9105.080	88.81	-10.39	3.46E-05
16:55	9115.080	88.81	-10.39	3.46E-05

ADJUSTED DATA

17:05	9125.080	88.81	-10.39	3.46E-05
17:15	9135.080	88.81	-10.39	3.47E-05
17:25	9145.080	88.81	-10.39	3.47E-05
17:35	9155.080	88.81	-10.39	3.47E-05
17:45	9165.080	88.81	-10.39	3.48E-05
17:55	9175.080	88.81	-10.39	3.48E-05
18:05	9185.080	88.81	-10.39	3.49E-05
18:15	9195.080	88.81	-10.39	3.49E-05
18:25	9205.080	88.81	-10.39	3.49E-05
18:35	9215.080	88.81	-10.39	3.50E-05
18:45	9225.080	88.81	-10.39	3.50E-05
18:55	9235.080	88.81	-10.39	3.50E-05
19:05	9245.080	88.81	-10.39	3.51E-05
19:15	9255.080	88.81	-10.39	3.51E-05
19:25	9265.080	88.81	-10.39	3.52E-05
19:35	9275.070	88.81	-10.39	3.52E-05
19:45	9285.080	88.85	-10.43	3.52E-05
19:55	9295.080	88.86	-10.44	3.53E-05
20:05	9305.080	88.86	-10.44	3.53E-05
20:15	9315.080	88.85	-10.43	3.53E-05
20:25	9325.080	88.85	-10.43	3.54E-05
20:35	9335.080	88.85	-10.43	3.54E-05
20:45	9345.080	88.85	-10.43	3.55E-05
20:55	9355.080	88.85	-10.43	3.55E-05
21:05	9365.080	88.85	-10.43	3.55E-05
21:15	9375.080	88.85	-10.43	3.56E-05
21:25	9385.080	88.85	-10.43	3.56E-05
21:35	9395.080	88.85	-10.43	3.57E-05
21:45	9405.080	88.83	-10.41	3.57E-05
21:55	9415.080	88.83	-10.41	3.57E-05
22:05	9425.080	88.83	-10.41	3.58E-05
22:15	9435.080	88.83	-10.41	3.58E-05
22:25	9445.080	88.83	-10.41	3.58E-05
22:35	9455.080	88.83	-10.41	3.59E-05
22:45	9465.080	88.83	-10.41	3.59E-05
22:54	9475.020	88.82	-10.40	3.60E-05
23:05	9485.020	88.82	-10.40	3.60E-05
23:14	9495.020	88.83	-10.41	3.60E-05
23:25	9505.020	88.82	-10.40	3.61E-05
23:34	9515.020	88.83	-10.41	3.61E-05
23:45	9525.020	88.83	-10.41	3.61E-05
23:55	9535.020	88.84	-10.42	3.62E-05
00:05	9545.020	88.84	-10.42	3.62E-05
00:15	9555.020	88.84	-10.42	3.63E-05
00:25	9565.030	88.85	-10.43	3.63E-05
00:35	9575.030	88.85	-10.43	3.63E-05
00:44	9585.030	88.84	-10.42	3.64E-05
00:55	9595.030	88.84	-10.42	3.64E-05
01:04	9605.030	88.84	-10.42	3.64E-05
01:15	9615.030	88.84	-10.42	3.65E-05
01:25	9625.030	88.84	-10.42	3.65E-05
01:35	9635.030	88.84	-10.42	3.66E-05
01:45	9645.030	88.84	-10.42	3.66E-05
01:55	9655.030	88.84	-10.42	3.66E-05
02:05	9665.030	88.84	-10.42	3.67E-05
02:14	9675.030	88.85	-10.43	3.67E-05

ADJUSTED DATA

02:25	9685.030	88.85	-10.43	3.68E-05
02:34	9695.030	88.85	-10.43	3.68E-05
02:45	9705.030	88.85	-10.43	3.68E-05
02:55	9715.030	88.85	-10.43	3.69E-05
03:04	9725.000	88.85	-10.43	3.69E-05
03:15	9735.000	88.85	-10.43	3.69E-05
03:24	9745.000	88.85	-10.43	3.70E-05
03:35	9755.100	88.85	-10.43	3.70E-05
03:44	9765.000	88.85	-10.43	3.71E-05
03:55	9775.000	88.85	-10.43	3.71E-05
04:04	9785.000	88.85	-10.43	3.71E-05
04:15	9795.000	88.85	-10.43	3.72E-05
04:25	9805.000	88.85	-10.43	3.72E-05
04:34	9815.000	88.85	-10.43	3.72E-05
04:45	9825.000	88.84	-10.42	3.73E-05
04:54	9835.000	88.84	-10.42	3.73E-05
05:05	9845.000	88.84	-10.42	3.74E-05
05:14	9855.000	88.85	-10.43	3.74E-05
05:25	9865.000	88.85	-10.43	3.74E-05
05:34	9875.000	88.85	-10.43	3.75E-05
05:45	9885.000	88.85	-10.43	3.75E-05
05:55	9895.000	88.85	-10.43	3.75E-05
06:04	9905.000	88.85	-10.43	3.76E-05
06:15	9915.000	88.84	-10.42	3.76E-05
06:24	9925.000	88.85	-10.43	3.77E-05
06:35	9935.000	88.85	-10.43	3.77E-05
06:44	9945.000	88.85	-10.43	3.77E-05
06:55	9955.000	88.85	-10.43	3.78E-05
07:05	9965.100	88.85	-10.43	3.78E-05
07:15	9975.100	88.85	-10.43	3.79E-05
07:25	9985.100	88.85	-10.43	3.79E-05
07:35	9995.100	88.85	-10.43	3.79E-05
07:45	10005.100	88.85	-10.43	3.80E-05
07:55	10015.100	88.85	-10.43	3.80E-05
08:05	10025.100	88.85	-10.43	3.80E-05
08:15	10035.100	88.85	-10.43	3.81E-05
08:25	10045.100	88.85	-10.43	3.81E-05
08:35	10055.100	88.85	-10.43	3.82E-05
08:45	10065.100	88.85	-10.43	3.82E-05
08:55	10075.000	88.85	-10.43	3.82E-05
09:04	10085.000	88.85	-10.43	3.83E-05
09:15	10095.000	88.85	-10.43	3.83E-05
09:24	10105.000	88.85	-10.43	3.83E-05
09:28	10108.200	88.85	-10.43	3.84E-05

TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI-11 INPUT 2
RADIUS: 427.782 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 78.42 FEET
WATER STOP LEVEL: 90.06 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
11:10	0.017	-999.99	1090.05	1078.41	6.45E-11	6.01E+05
11:10	0.034	-999.99	1090.05	1078.41	1.29E-10	3.00E+05
11:10	0.050	-999.99	1090.05	1078.41	1.90E-10	2.04E+05
11:10	0.067	-999.99	1090.05	1078.41	2.54E-10	1.52E+05
11:10	0.084	-999.99	1090.05	1078.41	3.19E-10	1.22E+05
11:10	0.100	-999.99	1090.05	1078.41	3.79E-10	1.02E+05
11:10	0.117	-999.99	1090.05	1078.41	4.44E-10	8.73E+04
11:10	0.134	-999.99	1090.05	1078.41	5.09E-10	7.62E+04
11:10	0.150	-999.99	1090.05	1078.41	5.69E-10	6.81E+04
11:10	0.167	-999.99	1090.05	1078.41	6.34E-10	6.11E+04
11:10	0.257	90.05	0.01	11.63	9.75E-10	3.97E+04
11:10	0.341	90.05	0.01	11.63	1.29E-09	2.99E+04
11:10	0.424	90.05	0.01	11.63	1.61E-09	2.41E+04
11:10	0.507	90.05	0.01	11.63	1.92E-09	2.01E+04
11:10	0.591	90.05	0.01	11.63	2.24E-09	1.73E+04
11:10	0.674	90.05	0.01	11.63	2.56E-09	1.52E+04
11:10	0.757	90.05	0.01	11.63	2.87E-09	1.35E+04
11:10	0.841	90.05	0.01	11.63	3.19E-09	1.21E+04
11:10	0.924	90.05	0.01	11.63	3.51E-09	1.11E+04
11:11	1.007	90.06	0.00	11.64	3.82E-09	1.01E+04
11:11	1.413	90.06	0.00	11.64	5.36E-09	7.23E+03
11:11	1.747	90.06	0.00	11.64	6.63E-09	5.85E+03
11:12	2.080	90.06	0.00	11.64	7.89E-09	4.91E+03
11:12	2.413	90.06	0.00	11.64	9.16E-09	4.23E+03
11:12	2.747	90.06	0.00	11.64	1.04E-08	3.72E+03
11:13	3.080	90.06	0.00	11.64	1.17E-08	3.32E+03
11:13	3.413	90.06	0.00	11.64	1.30E-08	2.99E+03
11:13	3.747	90.06	0.00	11.64	1.42E-08	2.73E+03
11:14	4.080	90.06	0.00	11.64	1.55E-08	2.50E+03
11:14	4.413	90.06	0.00	11.64	1.67E-08	2.31E+03
11:14	4.747	90.06	0.00	11.64	1.80E-08	2.15E+03
11:15	5.080	90.06	0.00	11.64	1.93E-08	2.01E+03
11:15	5.413	90.06	0.00	11.64	2.05E-08	1.89E+03
11:15	5.747	90.06	0.00	11.64	2.18E-08	1.78E+03
11:16	6.080	90.06	0.00	11.64	2.31E-08	1.68E+03
11:16	6.413	90.06	0.00	11.64	2.43E-08	1.59E+03
11:16	6.747	90.06	0.00	11.64	2.56E-08	1.51E+03
11:17	7.080	90.06	0.00	11.64	2.69E-08	1.44E+03
11:17	7.413	90.05	0.01	11.63	2.81E-08	1.38E+03
11:17	7.747	90.06	0.00	11.64	2.94E-08	1.32E+03
11:18	8.080	90.05	0.01	11.63	3.07E-08	1.26E+03
11:18	8.413	90.05	0.01	11.63	3.19E-08	1.21E+03

11:18	8.747	90.05	0.01	11.63	3.32E-08	1.17E+03
11:19	9.080	90.05	0.01	11.63	3.45E-08	1.13E+03
11:19	9.413	90.05	0.01	11.63	3.57E-08	1.09E+03
11:19	9.747	90.05	0.01	11.63	3.70E-08	1.05E+03
11:20	10.080	90.05	0.01	11.63	3.83E-08	1.01E+03
11:22	12.115	90.04	0.02	11.62	4.60E-08	8.44E+02
11:24	14.115	90.03	0.03	11.61	5.36E-08	7.24E+02
11:26	16.115	90.03	0.03	11.61	6.12E-08	6.35E+02
11:28	18.115	90.01	0.05	11.59	6.87E-08	5.65E+02
11:30	20.115	90.00	0.06	11.58	7.63E-08	5.09E+02
11:32	22.115	89.98	0.08	11.56	8.39E-08	4.63E+02
11:34	24.115	89.96	0.10	11.54	9.15E-08	4.24E+02
11:36	26.115	89.94	0.12	11.52	9.91E-08	3.92E+02
11:38	28.115	89.92	0.14	11.50	1.07E-07	3.64E+02
11:40	30.115	89.90	0.16	11.48	1.14E-07	3.40E+02
11:42	32.115	89.88	0.18	11.46	1.22E-07	3.19E+02
11:44	34.115	89.85	0.21	11.43	1.29E-07	3.00E+02
11:46	36.115	89.83	0.23	11.41	1.37E-07	2.84E+02
11:48	38.115	89.81	0.25	11.39	1.45E-07	2.69E+02
11:50	40.115	89.79	0.27	11.37	1.52E-07	2.56E+02
11:52	42.115	89.77	0.29	11.35	1.60E-07	2.43E+02
11:54	44.115	89.75	0.31	11.33	1.67E-07	2.32E+02
11:56	46.115	89.72	0.34	11.30	1.75E-07	2.22E+02
11:58	48.115	89.70	0.36	11.28	1.83E-07	2.13E+02
12:00	50.115	89.68	0.38	11.26	1.90E-07	2.05E+02
12:02	52.115	89.66	0.40	11.24	1.98E-07	1.97E+02
12:04	54.115	89.64	0.42	11.22	2.05E-07	1.90E+02
12:06	56.115	89.62	0.44	11.20	2.13E-07	1.83E+02
12:08	58.115	89.60	0.46	11.18	2.21E-07	1.77E+02
12:10	60.115	89.58	0.48	11.16	2.28E-07	1.71E+02
12:12	62.102	89.56	0.50	11.14	2.36E-07	1.65E+02
12:14	64.492	89.53	0.53	11.11	2.45E-07	1.59E+02
12:16	66.188	89.51	0.55	11.09	2.51E-07	1.55E+02
12:18	68.188	89.49	0.57	11.07	2.59E-07	1.51E+02
12:20	70.188	89.47	0.59	11.05	2.66E-07	1.46E+02
12:22	72.188	89.45	0.61	11.03	2.74E-07	1.42E+02
12:24	74.188	89.43	0.63	11.01	2.82E-07	1.39E+02
12:26	76.188	89.41	0.65	10.99	2.89E-07	1.35E+02
12:28	78.188	89.39	0.67	10.97	2.97E-07	1.32E+02
12:30	80.188	89.37	0.69	10.95	3.04E-07	1.28E+02
12:32	82.188	89.35	0.71	10.93	3.12E-07	1.25E+02
12:34	84.188	89.33	0.73	10.91	3.19E-07	1.22E+02
12:36	86.188	89.31	0.75	10.89	3.27E-07	1.19E+02
12:38	88.188	89.29	0.77	10.87	3.35E-07	1.17E+02
12:40	90.188	89.27	0.79	10.85	3.42E-07	1.14E+02
12:42	92.188	89.24	0.82	10.82	3.50E-07	1.12E+02
12:44	94.188	89.23	0.83	10.81	3.57E-07	1.09E+02
12:46	96.188	89.22	0.84	10.80	3.65E-07	1.07E+02
12:48	98.188	89.20	0.86	10.78	3.73E-07	1.05E+02
13:10	120.110	88.85	1.21	10.43	4.56E-07	8.60E+01
13:30	140.110	88.64	1.42	10.22	5.32E-07	7.39E+01
13:50	160.120	88.50	1.56	10.08	6.08E-07	6.48E+01
14:10	180.120	88.38	1.68	9.96	6.84E-07	5.77E+01
14:30	200.120	88.26	1.80	9.84	7.59E-07	5.20E+01
14:50	220.120	88.12	1.94	9.70	8.35E-07	4.74E+01
15:10	240.120	88.04	2.02	9.62	9.11E-07	4.35E+01

15:30	260.120	87.92	2.14	9.50	9.87E-07	4.03E+01
15:50	280.120	87.81	2.25	9.39	1.06E-06	3.75E+01
16:10	300.120	87.70	2.36	9.28	1.14E-06	3.50E+01
16:30	320.050	87.57	2.49	9.15	1.21E-06	3.29E+01
16:49	340.050	87.40	2.66	8.98	1.29E-06	3.10E+01
17:10	360.050	87.33	2.73	8.91	1.37E-06	2.94E+01
17:30	380.050	87.24	2.82	8.82	1.44E-06	2.79E+01
17:50	400.050	87.10	2.96	8.68	1.52E-06	2.65E+01
18:10	420.050	87.02	3.04	8.60	1.59E-06	2.53E+01
18:30	440.050	86.96	3.10	8.54	1.67E-06	2.42E+01
18:50	460.050	86.88	3.18	8.46	1.75E-06	2.32E+01
19:10	480.050	86.78	3.28	8.36	1.82E-06	2.23E+01
19:30	500.050	86.74	3.32	8.32	1.90E-06	2.14E+01
19:49	520.050	86.66	3.40	8.24	1.97E-06	2.06E+01
20:10	540.050	86.50	3.56	8.08	2.05E-06	1.99E+01
20:30	560.050	86.42	3.64	8.00	2.13E-06	1.92E+01
20:50	580.050	86.40	3.66	7.98	2.20E-06	1.86E+01
21:10	600.050	86.37	3.69	7.95	2.28E-06	1.80E+01
21:30	620.050	86.33	3.73	7.91	2.35E-06	1.75E+01
21:50	640.050	86.28	3.78	7.86	2.43E-06	1.70E+01
22:10	660.050	86.22	3.84	7.80	2.50E-06	1.65E+01
22:30	680.050	86.18	3.88	7.76	2.58E-06	1.60E+01
22:49	700.050	86.12	3.94	7.70	2.66E-06	1.56E+01
23:10	720.050	86.07	3.99	7.65	2.73E-06	1.52E+01
23:30	740.050	86.01	4.05	7.59	2.81E-06	1.48E+01
23:50	760.100	85.96	4.10	7.54	2.88E-06	1.44E+01
00:10	780.100	85.91	4.15	7.49	2.96E-06	1.41E+01
00:30	800.100	85.86	4.20	7.44	3.04E-06	1.38E+01
00:50	820.100	85.81	4.25	7.39	3.11E-06	1.35E+01
01:10	840.100	85.76	4.30	7.34	3.19E-06	1.32E+01
01:30	860.100	85.71	4.35	7.29	3.26E-06	1.29E+01
01:50	880.100	85.66	4.40	7.24	3.34E-06	1.26E+01
02:10	900.100	85.60	4.46	7.18	3.42E-06	1.23E+01
02:30	920.100	85.56	4.50	7.14	3.49E-06	1.21E+01
02:50	940.100	85.53	4.53	7.11	3.57E-06	1.19E+01
03:10	960.100	85.48	4.58	7.06	3.64E-06	1.16E+01
03:30	980.100	85.44	4.62	7.02	3.72E-06	1.14E+01
03:50	1000.100	85.40	4.66	6.98	3.80E-06	1.12E+01
04:50	1060.300	85.27	4.79	6.85	4.02E-06	1.06E+01
05:50	1120.300	85.16	4.90	6.74	4.25E-06	1.01E+01
06:50	1180.300	85.03	5.03	6.61	4.48E-06	9.65E+00
07:50	1240.300	84.94	5.12	6.52	4.71E-06	9.23E+00
08:50	1300.300	84.83	5.23	6.41	4.93E-06	8.85E+00
09:50	1360.300	84.73	5.33	6.31	5.16E-06	8.51E+00
10:50	1420.300	84.55	5.51	6.13	5.39E-06	8.19E+00
11:50	1480.300	84.51	5.55	6.09	5.62E-06	7.90E+00
12:50	1540.300	84.46	5.60	6.04	5.85E-06	7.63E+00
13:50	1600.300	84.35	5.71	5.93	6.07E-06	7.38E+00
14:50	1660.300	84.24	5.82	5.82	6.30E-06	7.15E+00
15:50	1720.100	84.14	5.92	5.72	6.53E-06	6.94E+00
16:50	1780.100	84.07	5.99	5.65	6.76E-06	6.74E+00
17:50	1840.100	83.99	6.07	5.57	6.98E-06	6.55E+00
18:50	1900.100	83.89	6.17	5.47	7.21E-06	6.37E+00
19:50	1960.100	83.84	6.22	5.42	7.44E-06	6.21E+00
20:50	2020.100	83.80	6.26	5.38	7.67E-06	6.05E+00
21:50	2080.100	83.71	6.35	5.29	7.89E-06	5.91E+00

22:50	2140.100	83.66	6.40	5.24	8.12E-06	5.77E+00
23:50	2200.100	83.62	6.44	5.20	8.35E-06	5.64E+00
00:50	2260.100	83.56	6.50	5.14	8.58E-06	5.52E+00
01:50	2320.100	83.50	6.56	5.08	8.80E-06	5.40E+00
02:50	2380.100	83.44	6.62	5.02	9.03E-06	5.29E+00
03:50	2440.100	83.38	6.68	4.96	9.26E-06	5.18E+00
04:50	2500.100	83.32	6.74	4.90	9.49E-06	5.08E+00
05:50	2560.100	83.28	6.78	4.86	9.72E-06	4.99E+00
06:50	2620.100	83.23	6.83	4.81	9.94E-06	4.90E+00
07:50	2680.100	83.17	6.89	4.75	1.02E-05	4.81E+00
08:50	2740.200	83.12	6.94	4.70	1.04E-05	4.73E+00
09:50	2800.200	83.08	6.98	4.66	1.06E-05	4.65E+00
10:50	2860.200	83.03	7.03	4.61	1.09E-05	4.57E+00
11:50	2920.100	82.98	7.08	4.56	1.11E-05	4.50E+00
12:50	2980.200	82.92	7.14	4.50	1.13E-05	4.43E+00
13:50	3040.200	82.86	7.20	4.44	1.15E-05	4.36E+00
14:50	3100.200	82.80	7.26	4.38	1.18E-05	4.29E+00
15:50	3160.200	82.74	7.32	4.32	1.20E-05	4.23E+00
16:50	3220.200	82.69	7.37	4.27	1.22E-05	4.17E+00
17:50	3280.200	82.65	7.41	4.23	1.24E-05	4.11E+00
18:50	3340.200	82.59	7.47	4.17	1.27E-05	4.06E+00
19:50	3400.200	82.56	7.50	4.14	1.29E-05	4.00E+00
20:50	3460.200	82.52	7.54	4.10	1.31E-05	3.95E+00
21:50	3520.200	82.48	7.58	4.06	1.34E-05	3.90E+00
22:50	3580.200	82.44	7.62	4.02	1.36E-05	3.85E+00
23:50	3640.200	82.40	7.66	3.98	1.38E-05	3.80E+00
00:50	3700.200	82.36	7.70	3.94	1.40E-05	3.76E+00
01:50	3760.200	82.32	7.74	3.90	1.43E-05	3.72E+00
02:50	3820.200	82.28	7.78	3.86	1.45E-05	3.67E+00
03:50	3880.200	82.24	7.82	3.82	1.47E-05	3.63E+00
04:50	3940.200	82.20	7.86	3.78	1.50E-05	3.59E+00
05:50	4000.200	82.16	7.90	3.74	1.52E-05	3.55E+00
06:50	4060.200	82.12	7.94	3.70	1.54E-05	3.51E+00
07:50	4120.200	82.08	7.98	3.66	1.56E-05	3.48E+00
08:50	4180.200	82.06	8.00	3.64	1.59E-05	3.44E+00
09:50	4240.200	82.03	8.03	3.61	1.61E-05	3.41E+00
10:50	4300.200	82.00	8.06	3.58	1.63E-05	3.37E+00
11:04	4314.800	81.99	8.07	3.57	1.64E-05	3.37E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-4 INPUT 4
RADIUS: 784.360 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 80.79 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
09:00	0.000	80.79	0.00	0.00E+00
09:00	0.017	-99.99	180.78	1.92E-11
09:00	0.034	-99.99	180.78	3.84E-11
09:00	0.050	-99.99	180.78	5.64E-11
09:00	0.067	-99.99	180.78	7.56E-11
09:00	0.084	-99.99	180.78	9.48E-11
09:00	0.100	-99.99	180.78	1.13E-10
09:00	0.117	-99.99	180.78	1.32E-10
09:00	0.134	-99.99	180.78	1.51E-10
09:00	0.150	-99.99	180.78	1.69E-10
09:00	0.167	-99.99	180.78	1.89E-10
09:00	0.257	80.79	0.00	2.90E-10
09:00	0.340	80.79	0.00	3.84E-10
09:00	0.424	80.79	0.00	4.79E-10
09:00	0.507	80.79	0.00	5.72E-10
09:00	0.590	80.79	0.00	6.66E-10
09:00	0.674	80.79	0.00	7.61E-10
09:00	0.757	80.79	0.00	8.54E-10
09:00	0.840	80.79	0.00	9.48E-10
09:00	0.924	80.79	0.00	1.04E-09
09:01	1.007	80.79	0.00	1.14E-09
09:01	1.414	80.79	0.00	1.60E-09
09:01	1.748	80.79	0.00	1.97E-09
09:02	2.081	80.79	0.00	2.35E-09
09:02	2.414	80.79	0.00	2.72E-09
09:02	2.748	80.79	0.00	3.10E-09
09:03	3.081	80.79	0.00	3.48E-09
09:03	3.415	80.79	0.00	3.85E-09
09:03	3.748	80.79	0.00	4.23E-09
09:04	4.081	80.79	0.00	4.61E-09
09:04	4.414	80.79	0.00	4.98E-09
09:04	4.748	80.79	0.00	5.36E-09
09:05	5.081	80.79	0.00	5.74E-09
09:05	5.414	80.79	0.00	6.11E-09
09:05	5.748	80.79	0.00	6.49E-09
09:06	6.081	80.79	0.00	6.86E-09
09:06	6.415	80.79	0.00	7.24E-09
09:06	6.748	80.79	0.00	7.62E-09
09:07	7.081	80.79	0.00	7.99E-09
09:07	7.415	80.79	0.00	8.37E-09
09:07	7.748	80.79	0.00	8.75E-09

09:08	8.081	80.79	0.00	9.12E-09
09:08	8.415	80.79	0.00	9.50E-09
09:08	8.748	80.79	0.00	9.87E-09
09:09	9.081	80.79	0.00	1.03E-08
09:09	9.414	80.79	0.00	1.06E-08
09:09	9.748	80.79	0.00	1.10E-08
09:10	10.081	80.79	0.00	1.14E-08
09:12	12.108	80.79	0.00	1.37E-08
09:14	14.152	80.80	-0.01	1.60E-08
09:16	16.152	80.80	-0.01	1.82E-08
09:18	18.152	80.80	-0.01	2.05E-08
09:20	20.152	80.80	-0.01	2.27E-08
09:22	22.152	80.80	-0.01	2.50E-08
09:24	24.152	80.80	-0.01	2.73E-08
09:26	26.152	80.80	-0.01	2.95E-08
09:28	28.215	80.81	-0.02	3.18E-08
09:30	30.197	80.81	-0.02	3.41E-08
09:32	32.197	80.82	-0.03	3.63E-08
09:34	34.197	80.82	-0.03	3.86E-08
09:36	36.197	80.83	-0.04	4.09E-08
09:38	38.197	80.83	-0.04	4.31E-08
09:40	40.197	80.84	-0.05	4.54E-08
09:42	42.197	80.85	-0.06	4.76E-08
09:44	44.197	80.85	-0.06	4.99E-08
09:46	46.197	80.86	-0.07	5.21E-08
09:48	48.197	80.87	-0.08	5.44E-08
09:50	50.197	80.88	-0.09	5.67E-08
09:52	52.197	80.89	-0.10	5.89E-08
09:54	54.197	80.90	-0.11	6.12E-08
09:56	56.217	80.91	-0.12	6.35E-08
09:58	58.100	80.92	-0.13	6.56E-08
10:00	60.245	80.93	-0.14	6.80E-08
10:02	62.245	80.94	-0.15	7.03E-08
10:04	64.245	80.95	-0.16	7.25E-08
10:06	66.245	80.96	-0.17	7.48E-08
10:08	68.245	80.97	-0.18	7.70E-08
10:10	70.245	80.98	-0.19	7.93E-08
10:12	72.245	80.99	-0.20	8.15E-08
10:14	74.245	81.01	-0.22	8.38E-08
10:16	76.245	81.02	-0.23	8.61E-08
10:18	78.245	81.03	-0.24	8.83E-08
10:20	80.245	81.04	-0.25	9.06E-08
10:22	82.245	81.06	-0.27	9.28E-08
10:24	84.245	81.07	-0.28	9.51E-08
10:26	86.245	81.08	-0.29	9.74E-08
10:28	88.245	81.10	-0.31	9.96E-08
10:30	90.245	81.11	-0.32	1.02E-07
10:32	92.245	81.12	-0.33	1.04E-07
10:34	94.245	81.14	-0.35	1.06E-07
10:36	96.245	81.15	-0.36	1.09E-07
10:38	98.245	81.17	-0.38	1.11E-07
11:00	120.210	81.33	-0.54	1.36E-07
11:20	140.210	81.48	-0.69	1.58E-07
11:40	160.210	81.63	-0.84	1.81E-07
12:00	180.220	81.77	-0.98	2.03E-07
12:20	200.220	81.91	-1.12	2.26E-07

12:40	220.220	82.05	-1.26	2.49E-07
13:00	240.220	82.18	-1.39	2.71E-07
13:20	260.220	82.30	-1.51	2.94E-07
13:40	280.230	82.42	-1.63	3.16E-07
14:00	300.230	82.53	-1.74	3.39E-07
14:20	320.230	82.63	-1.84	3.61E-07
14:40	340.180	82.74	-1.95	3.84E-07
15:00	360.100	82.83	-2.04	4.06E-07
15:20	380.100	82.91	-2.12	4.29E-07
15:40	400.100	83.00	-2.21	4.52E-07
16:00	420.170	83.07	-2.28	4.74E-07
16:20	440.250	83.14	-2.35	4.97E-07
16:40	460.200	83.22	-2.43	5.19E-07
17:00	480.170	83.28	-2.49	5.42E-07
17:20	500.170	83.35	-2.56	5.65E-07
17:40	520.130	83.41	-2.62	5.87E-07
18:00	540.120	83.47	-2.68	6.10E-07
18:20	560.220	83.53	-2.74	6.32E-07
18:40	580.080	83.60	-2.81	6.55E-07
19:00	600.220	83.67	-2.88	6.78E-07
19:20	620.230	83.74	-2.95	7.00E-07
19:40	640.220	83.81	-3.02	7.23E-07
20:00	660.220	83.87	-3.08	7.45E-07
20:20	680.130	83.94	-3.15	7.68E-07
20:40	700.120	84.01	-3.22	7.90E-07
21:00	720.230	84.07	-3.28	8.13E-07
21:20	740.300	84.13	-3.34	8.36E-07
21:40	760.230	84.19	-3.40	8.58E-07
22:00	780.230	84.25	-3.46	8.81E-07
22:20	800.230	84.31	-3.52	9.03E-07
22:40	820.180	84.37	-3.58	9.26E-07
23:00	840.570	84.43	-3.64	9.49E-07
23:20	860.180	84.48	-3.69	9.71E-07
23:40	880.080	84.54	-3.75	9.93E-07
00:00	900.170	84.59	-3.80	1.02E-06
00:20	920.170	84.64	-3.85	1.04E-06
00:40	940.170	84.69	-3.90	1.06E-06
01:00	960.170	84.74	-3.95	1.08E-06
01:20	980.170	84.79	-4.00	1.11E-06
01:40	1000.200	84.84	-4.05	1.13E-06
02:40	1060.300	84.98	-4.19	1.20E-06
03:40	1120.300	85.11	-4.32	1.26E-06
04:40	1180.300	85.23	-4.44	1.33E-06
05:40	1240.300	85.36	-4.57	1.40E-06
06:40	1300.300	85.47	-4.68	1.47E-06
07:40	1360.200	85.58	-4.79	1.54E-06
08:40	1420.200	85.68	-4.89	1.60E-06
09:40	1480.200	85.79	-5.00	1.67E-06
10:40	1540.200	85.88	-5.09	1.74E-06
11:40	1600.300	85.96	-5.17	1.81E-06
12:40	1660.300	86.03	-5.24	1.87E-06
13:40	1720.200	86.09	-5.30	1.94E-06
14:40	1780.300	86.17	-5.38	2.01E-06
15:40	1840.300	86.25	-5.46	2.08E-06
16:40	1900.300	86.29	-5.50	2.15E-06
17:40	1960.200	86.36	-5.57	2.21E-06

18:40	2020.200	86.44	-5.65	2.28E-06
19:40	2080.200	86.52	-5.73	2.35E-06
20:40	2140.200	86.60	-5.81	2.42E-06
21:40	2200.300	86.68	-5.89	2.48E-06
22:40	2260.300	86.76	-5.97	2.55E-06
23:40	2320.200	86.83	-6.04	2.62E-06
00:40	2380.200	86.90	-6.11	2.69E-06
01:40	2440.200	86.97	-6.18	2.75E-06
02:40	2500.200	87.04	-6.25	2.82E-06
03:40	2560.200	87.11	-6.32	2.89E-06
04:40	2620.200	87.17	-6.38	2.96E-06
05:40	2680.200	87.23	-6.44	3.03E-06
06:40	2740.200	87.30	-6.51	3.09E-06
07:40	2800.200	87.36	-6.57	3.16E-06
08:40	2860.300	87.42	-6.63	3.23E-06
09:40	2920.300	87.48	-6.69	3.30E-06
10:40	2980.300	87.55	-6.76	3.36E-06
11:40	3040.200	87.62	-6.83	3.43E-06
12:40	3100.200	87.68	-6.89	3.50E-06
13:40	3160.300	87.73	-6.94	3.57E-06
14:40	3220.300	87.79	-7.00	3.63E-06
15:40	3280.200	87.85	-7.06	3.70E-06
16:40	3340.200	87.91	-7.12	3.77E-06
17:40	3400.300	87.96	-7.17	3.84E-06
18:40	3460.300	88.01	-7.22	3.91E-06
19:40	3520.300	88.07	-7.28	3.97E-06
20:40	3580.200	88.12	-7.33	4.04E-06
21:40	3640.200	88.17	-7.38	4.11E-06
22:40	3700.200	88.22	-7.43	4.18E-06
23:40	3760.200	88.27	-7.48	4.24E-06
00:40	3820.200	88.32	-7.53	4.31E-06
01:40	3880.200	88.36	-7.57	4.38E-06
02:40	3940.200	88.41	-7.62	4.45E-06
03:40	4000.200	88.45	-7.66	4.52E-06
04:40	4060.200	88.50	-7.71	4.58E-06
05:40	4120.200	88.54	-7.75	4.65E-06
06:40	4180.200	88.60	-7.81	4.72E-06
07:40	4240.300	88.64	-7.85	4.79E-06
08:40	4300.300	88.69	-7.90	4.85E-06
09:40	4360.700	88.74	-7.95	4.92E-06
10:40	4420.300	88.78	-7.99	4.99E-06
11:40	4480.300	88.81	-8.02	5.06E-06
12:40	4540.300	88.85	-8.06	5.12E-06
13:40	4600.300	88.88	-8.09	5.19E-06
14:40	4660.300	88.94	-8.15	5.26E-06
15:40	4720.300	88.95	-8.16	5.33E-06
16:40	4780.300	88.99	-8.20	5.40E-06
17:40	4840.300	89.04	-8.25	5.46E-06
18:40	4900.300	89.06	-8.27	5.53E-06
19:40	4960.300	89.08	-8.29	5.60E-06
20:40	5020.300	89.11	-8.32	5.67E-06
21:40	5080.300	89.14	-8.35	5.73E-06
22:40	5140.300	89.17	-8.38	5.80E-06
23:40	5200.300	89.20	-8.41	5.87E-06
00:40	5260.300	89.22	-8.43	5.94E-06
01:40	5320.300	89.25	-8.46	6.01E-06

02:40	5380.300	89.28	-8.49	6.07E-06
03:40	5440.300	89.31	-8.52	6.14E-06
04:40	5500.300	89.33	-8.54	6.21E-06
05:40	5560.300	89.36	-8.57	6.28E-06
06:40	5620.300	89.40	-8.61	6.34E-06
07:40	5680.300	89.43	-8.64	6.41E-06
08:40	5740.300	89.45	-8.66	6.48E-06
09:40	5800.300	89.49	-8.70	6.55E-06
10:40	5860.300	89.52	-8.73	6.61E-06
11:40	5920.300	89.54	-8.75	6.68E-06
12:40	5980.300	89.56	-8.77	6.75E-06
13:40	6040.300	89.57	-8.78	6.82E-06
14:40	6100.300	89.59	-8.80	6.89E-06
15:40	6160.500	89.62	-8.83	6.95E-06
16:40	6220.300	89.64	-8.85	7.02E-06
17:40	6280.300	89.66	-8.87	7.09E-06
18:40	6340.300	89.69	-8.90	7.16E-06
19:40	6400.400	89.71	-8.92	7.22E-06
20:40	6460.200	89.73	-8.94	7.29E-06
21:40	6520.200	89.76	-8.97	7.36E-06
22:40	6580.300	89.78	-8.99	7.43E-06
23:40	6640.300	89.81	-9.02	7.50E-06
00:40	6700.300	89.83	-9.04	7.56E-06
01:40	6760.300	89.86	-9.07	7.63E-06
02:40	6820.300	89.87	-9.08	7.70E-06
03:40	6880.300	89.89	-9.10	7.77E-06
04:40	6940.300	89.91	-9.12	7.83E-06
05:40	7000.300	89.93	-9.14	7.90E-06
06:40	7060.300	89.95	-9.16	7.97E-06
07:40	7120.300	89.94	-9.15	8.04E-06
08:40	7180.300	89.88	-9.09	8.10E-06
09:40	7240.300	89.83	-9.04	8.17E-06
10:40	7300.300	89.77	-8.98	8.24E-06
11:40	7360.300	89.72	-8.93	8.31E-06
12:40	7420.300	89.70	-8.91	8.38E-06
13:40	7480.300	89.68	-8.89	8.44E-06
14:40	7540.300	89.69	-8.90	8.51E-06
15:40	7600.300	89.72	-8.93	8.58E-06
16:40	7660.300	89.76	-8.97	8.65E-06
17:40	7720.300	89.79	-9.00	8.71E-06
18:40	7780.200	89.84	-9.05	8.78E-06
19:40	7840.200	89.89	-9.10	8.85E-06
20:40	7900.300	89.94	-9.15	8.92E-06
21:40	7960.300	90.00	-9.21	8.99E-06
22:40	8020.300	90.04	-9.25	9.05E-06
23:40	8080.300	90.09	-9.30	9.12E-06
00:40	8140.300	90.13	-9.34	9.19E-06
01:40	8200.300	90.16	-9.37	9.26E-06
02:40	8260.300	90.19	-9.40	9.32E-06
03:40	8320.300	90.22	-9.43	9.39E-06
04:40	8380.300	90.24	-9.45	9.46E-06
05:40	8440.300	90.26	-9.47	9.53E-06
06:40	8500.300	90.29	-9.50	9.59E-06
07:40	8560.200	90.31	-9.52	9.66E-06
08:40	8620.300	90.34	-9.55	9.73E-06
09:00	8640.600	90.34	-9.55	9.75E-06

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 3-4 INPUT 4
RADIUS: 784.360 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 80.79 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
10:25	8725.000	90.32	-9.53	9.85E-06
10:35	8735.071	90.32	-9.53	9.86E-06
10:45	8745.070	90.31	-9.52	9.87E-06
10:55	8755.072	90.31	-9.52	9.88E-06
11:05	8765.072	90.30	-9.51	9.89E-06
11:15	8775.072	90.30	-9.51	9.91E-06
11:25	8785.072	90.30	-9.51	9.92E-06
11:35	8795.072	90.29	-9.50	9.93E-06
11:45	8805.072	90.29	-9.50	9.94E-06
11:55	8815.102	90.29	-9.50	9.95E-06
12:05	8825.090	90.29	-9.50	9.96E-06
12:15	8835.090	90.29	-9.50	9.97E-06
12:25	8845.090	90.29	-9.50	9.98E-06
12:35	8855.090	90.30	-9.51	1.00E-05
12:45	8865.090	90.29	-9.50	1.00E-05
12:55	8875.120	90.29	-9.50	1.00E-05
13:04	8884.970	90.30	-9.51	1.00E-05
13:14	8894.970	90.30	-9.51	1.00E-05
13:25	8904.970	90.30	-9.51	1.01E-05
13:34	8914.970	90.30	-9.51	1.01E-05
13:45	8924.970	90.31	-9.52	1.01E-05
13:54	8934.970	90.30	-9.51	1.01E-05
14:05	8944.970	90.31	-9.52	1.01E-05
14:14	8955.020	90.31	-9.52	1.01E-05
14:25	8965.080	90.32	-9.53	1.01E-05
14:35	8975.080	90.32	-9.53	1.01E-05
14:45	8985.080	90.32	-9.53	1.01E-05
14:55	8995.080	90.32	-9.53	1.02E-05
15:05	9005.080	90.32	-9.53	1.02E-05
15:15	9015.080	90.33	-9.54	1.02E-05
15:25	9025.080	90.33	-9.54	1.02E-05
15:35	9035.080	90.33	-9.54	1.02E-05
15:45	9045.080	90.34	-9.55	1.02E-05
15:55	9055.080	90.34	-9.55	1.02E-05
16:04	9065.020	90.35	-9.56	1.02E-05
16:15	9075.020	90.35	-9.56	1.02E-05
16:25	9084.970	90.35	-9.56	1.03E-05
16:35	9095.080	90.36	-9.57	1.03E-05
16:45	9105.080	90.37	-9.58	1.03E-05
16:55	9115.080	90.37	-9.58	1.03E-05

ADJUSTED DATA

17:05	9125.080	90.38	-9.59	1.03E-05
17:15	9135.080	90.38	-9.59	1.03E-05
17:25	9145.080	90.39	-9.60	1.03E-05
17:35	9155.080	90.39	-9.60	1.03E-05
17:45	9165.080	90.40	-9.61	1.03E-05
17:55	9175.080	90.41	-9.62	1.04E-05
18:05	9185.080	90.41	-9.62	1.04E-05
18:15	9195.080	90.42	-9.63	1.04E-05
18:25	9205.080	90.43	-9.64	1.04E-05
18:35	9215.080	90.43	-9.64	1.04E-05
18:45	9225.080	90.44	-9.65	1.04E-05
18:55	9235.080	90.44	-9.65	1.04E-05
19:05	9245.080	90.45	-9.66	1.04E-05
19:15	9255.080	90.46	-9.67	1.04E-05
19:25	9265.080	90.46	-9.67	1.05E-05
19:35	9275.070	90.46	-9.67	1.05E-05
19:45	9285.080	90.47	-9.68	1.05E-05
19:55	9295.080	90.48	-9.69	1.05E-05
20:05	9305.080	90.48	-9.69	1.05E-05
20:15	9315.080	90.49	-9.70	1.05E-05
20:25	9325.080	90.49	-9.70	1.05E-05
20:35	9335.080	90.50	-9.71	1.05E-05
20:45	9345.080	90.50	-9.71	1.05E-05
20:55	9355.080	90.51	-9.72	1.06E-05
21:05	9365.080	90.52	-9.73	1.06E-05
21:15	9375.080	90.53	-9.74	1.06E-05
21:25	9385.080	90.53	-9.74	1.06E-05
21:35	9395.080	90.54	-9.75	1.06E-05
21:45	9405.080	90.54	-9.75	1.06E-05
21:55	9415.080	90.55	-9.76	1.06E-05
22:05	9425.080	90.55	-9.76	1.06E-05
22:15	9435.080	90.56	-9.77	1.07E-05
22:25	9445.080	90.56	-9.77	1.07E-05
22:35	9455.080	90.57	-9.78	1.07E-05
22:45	9465.080	90.57	-9.78	1.07E-05
22:54	9475.020	90.58	-9.79	1.07E-05
23:05	9485.020	90.58	-9.79	1.07E-05
23:14	9495.020	90.59	-9.80	1.07E-05
23:25	9505.020	90.59	-9.80	1.07E-05
23:34	9515.020	90.60	-9.81	1.07E-05
23:45	9525.020	90.60	-9.81	1.08E-05
23:55	9535.020	90.61	-9.82	1.08E-05
00:05	9545.020	90.61	-9.82	1.08E-05
00:15	9555.020	90.62	-9.83	1.08E-05
00:25	9565.030	90.62	-9.83	1.08E-05
00:35	9575.030	90.62	-9.83	1.08E-05
00:44	9585.030	90.63	-9.84	1.08E-05
00:55	9595.030	90.63	-9.84	1.08E-05
01:04	9605.030	90.64	-9.85	1.08E-05
01:15	9615.030	90.64	-9.85	1.09E-05
01:25	9625.030	90.65	-9.86	1.09E-05
01:35	9635.030	90.65	-9.86	1.09E-05
01:45	9645.030	90.66	-9.87	1.09E-05
01:55	9655.030	90.66	-9.87	1.09E-05
02:05	9665.030	90.67	-9.88	1.09E-05
02:14	9675.030	90.67	-9.88	1.09E-05

ADJUSTED DATA

02:25	9685.030	90.67	-9.88	1.09E-05
02:34	9695.030	90.68	-9.89	1.09E-05
02:45	9705.030	90.69	-9.90	1.10E-05
02:55	9715.030	90.69	-9.90	1.10E-05
03:04	9725.000	90.69	-9.90	1.10E-05
03:15	9735.000	90.70	-9.91	1.10E-05
03:24	9745.000	90.70	-9.91	1.10E-05
03:35	9755.100	90.70	-9.91	1.10E-05
03:44	9765.000	90.71	-9.92	1.10E-05
03:55	9775.000	90.71	-9.92	1.10E-05
04:04	9785.000	90.71	-9.92	1.10E-05
04:15	9795.000	90.72	-9.93	1.11E-05
04:25	9805.000	90.72	-9.93	1.11E-05
04:34	9815.000	90.73	-9.94	1.11E-05
04:45	9825.000	90.73	-9.94	1.11E-05
04:54	9835.000	90.73	-9.94	1.11E-05
05:05	9845.000	90.74	-9.95	1.11E-05
05:14	9855.000	90.74	-9.95	1.11E-05
05:25	9865.000	90.74	-9.95	1.11E-05
05:34	9875.000	90.75	-9.96	1.11E-05
05:45	9885.000	90.75	-9.96	1.12E-05
05:55	9895.000	90.76	-9.97	1.12E-05
06:04	9905.000	90.76	-9.97	1.12E-05
06:15	9915.000	90.76	-9.97	1.12E-05
06:24	9925.000	90.77	-9.98	1.12E-05
06:35	9935.000	90.77	-9.98	1.12E-05
06:44	9945.000	90.78	-9.99	1.12E-05
06:55	9955.000	90.78	-9.99	1.12E-05
07:05	9965.100	90.78	-9.99	1.12E-05
07:15	9975.100	90.79	-10.00	1.13E-05
07:25	9985.100	90.80	-10.01	1.13E-05
07:35	9995.100	90.80	-10.01	1.13E-05
07:45	10005.100	90.80	-10.01	1.13E-05
07:55	10015.100	90.81	-10.02	1.13E-05
08:05	10025.100	90.81	-10.02	1.13E-05
08:15	10035.100	90.82	-10.03	1.13E-05
08:25	10045.100	90.82	-10.03	1.13E-05
08:35	10055.100	90.83	-10.04	1.13E-05
08:45	10065.100	90.84	-10.05	1.14E-05
08:55	10075.000	90.84	-10.05	1.14E-05
09:04	10085.000	90.85	-10.06	1.14E-05
09:15	10095.000	90.85	-10.06	1.14E-05
09:24	10105.000	90.85	-10.06	1.14E-05
09:28	10108.200	90.85	-10.06	1.14E-05

TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 3-4 INPUT 4
RADIUS: 784.360 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 80.79 FEET
WATER STOP LEVEL: 91.11 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
11:10	0.017	-999.99	1091.10	1080.78	1.92E-11	6.01E+05
11:10	0.034	-999.99	1091.10	1080.78	3.84E-11	3.00E+05
11:10	0.050	-999.99	1091.10	1080.78	5.64E-11	2.04E+05
11:10	0.067	-999.99	1091.10	1080.78	7.56E-11	1.52E+05
11:10	0.084	-999.99	1091.10	1080.78	9.48E-11	1.22E+05
11:10	0.100	-999.99	1091.10	1080.78	1.13E-10	1.02E+05
11:10	0.117	-999.99	1091.10	1080.78	1.32E-10	8.73E+04
11:10	0.134	-999.99	1091.10	1080.78	1.51E-10	7.62E+04
11:10	0.150	-999.99	1091.10	1080.78	1.69E-10	6.81E+04
11:10	0.167	-999.99	1091.10	1080.78	1.89E-10	6.11E+04
11:10	0.257	91.11	0.00	10.32	2.90E-10	3.97E+04
11:10	0.341	91.11	0.00	10.32	3.85E-10	2.99E+04
11:10	0.424	91.11	0.00	10.32	4.79E-10	2.41E+04
11:10	0.507	91.11	0.00	10.32	5.72E-10	2.01E+04
11:10	0.591	91.11	0.00	10.32	6.67E-10	1.73E+04
11:10	0.674	91.11	0.00	10.32	7.61E-10	1.52E+04
11:10	0.757	91.11	0.00	10.32	8.54E-10	1.35E+04
11:10	0.841	91.11	0.00	10.32	9.49E-10	1.21E+04
11:10	0.924	91.11	0.00	10.32	1.04E-09	1.11E+04
11:11	1.007	91.11	0.00	10.32	1.14E-09	1.01E+04
11:11	1.413	91.11	0.00	10.32	1.59E-09	7.23E+03
11:11	1.747	91.11	0.00	10.32	1.97E-09	5.85E+03
11:12	2.080	91.11	0.00	10.32	2.35E-09	4.91E+03
11:12	2.413	91.11	0.00	10.32	2.72E-09	4.23E+03
11:12	2.747	91.11	0.00	10.32	3.10E-09	3.72E+03
11:13	3.080	91.11	0.00	10.32	3.48E-09	3.32E+03
11:13	3.413	91.11	0.00	10.32	3.85E-09	2.99E+03
11:13	3.747	91.11	0.00	10.32	4.23E-09	2.73E+03
11:14	4.080	91.11	0.00	10.32	4.61E-09	2.50E+03
11:14	4.413	91.11	0.00	10.32	4.98E-09	2.31E+03
11:14	4.747	91.11	0.00	10.32	5.36E-09	2.15E+03
11:15	5.080	91.11	0.00	10.32	5.73E-09	2.01E+03
11:15	5.413	91.11	0.00	10.32	6.11E-09	1.89E+03
11:15	5.747	91.11	0.00	10.32	6.49E-09	1.78E+03
11:16	6.080	91.11	0.00	10.32	6.86E-09	1.68E+03
11:16	6.413	91.11	0.00	10.32	7.24E-09	1.59E+03
11:16	6.747	91.11	0.00	10.32	7.62E-09	1.51E+03
11:17	7.080	91.11	0.00	10.32	7.99E-09	1.44E+03
11:17	7.413	91.11	0.00	10.32	8.37E-09	1.38E+03
11:17	7.747	91.11	0.00	10.32	8.74E-09	1.32E+03
11:18	8.080	91.11	0.00	10.32	9.12E-09	1.26E+03
11:18	8.413	91.11	0.00	10.32	9.50E-09	1.21E+03

11:18	8.747	91.11	0.00	10.32	9.87E-09	1.17E+03
11:19	9.080	91.11	0.00	10.32	1.02E-08	1.13E+03
11:19	9.413	91.11	0.00	10.32	1.06E-08	1.09E+03
11:19	9.747	91.11	0.00	10.32	1.10E-08	1.05E+03
11:20	10.080	91.11	0.00	10.32	1.14E-08	1.01E+03
11:22	12.115	91.11	0.00	10.32	1.37E-08	8.44E+02
11:24	14.115	91.11	0.00	10.32	1.59E-08	7.24E+02
11:26	16.115	91.11	0.00	10.32	1.82E-08	6.35E+02
11:28	18.115	91.11	0.00	10.32	2.04E-08	5.65E+02
11:30	20.115	91.11	0.00	10.32	2.27E-08	5.09E+02
11:32	22.115	91.11	0.00	10.32	2.50E-08	4.63E+02
11:34	24.115	91.11	0.00	10.32	2.72E-08	4.24E+02
11:36	26.115	91.11	0.00	10.32	2.95E-08	3.92E+02
11:38	28.115	91.11	0.00	10.32	3.17E-08	3.64E+02
11:40	30.115	91.10	0.01	10.31	3.40E-08	3.40E+02
11:42	32.115	91.09	0.02	10.30	3.63E-08	3.19E+02
11:44	34.115	91.09	0.02	10.30	3.85E-08	3.00E+02
11:46	36.115	91.09	0.02	10.30	4.08E-08	2.84E+02
11:48	38.115	91.09	0.02	10.30	4.30E-08	2.69E+02
11:50	40.115	91.08	0.03	10.29	4.53E-08	2.56E+02
11:52	42.115	91.08	0.03	10.29	4.75E-08	2.43E+02
11:54	44.115	91.07	0.04	10.28	4.98E-08	2.32E+02
11:56	46.115	91.07	0.04	10.28	5.21E-08	2.22E+02
11:58	48.115	91.06	0.05	10.27	5.43E-08	2.13E+02
12:00	50.115	91.05	0.06	10.26	5.66E-08	2.05E+02
12:02	52.115	91.04	0.07	10.25	5.88E-08	1.97E+02
12:04	54.115	91.03	0.08	10.24	6.11E-08	1.90E+02
12:06	56.115	91.02	0.09	10.23	6.33E-08	1.83E+02
12:08	58.115	91.01	0.10	10.22	6.56E-08	1.77E+02
12:10	60.115	91.00	0.11	10.21	6.79E-08	1.71E+02
12:12	62.102	91.00	0.11	10.21	7.01E-08	1.65E+02
12:14	64.492	90.98	0.13	10.19	7.28E-08	1.59E+02
12:16	66.188	90.98	0.13	10.19	7.47E-08	1.55E+02
12:18	68.188	90.97	0.14	10.18	7.70E-08	1.51E+02
12:20	70.188	90.96	0.15	10.17	7.92E-08	1.46E+02
12:22	72.188	90.95	0.16	10.16	8.15E-08	1.42E+02
12:24	74.188	90.94	0.17	10.15	8.37E-08	1.39E+02
12:26	76.188	90.93	0.18	10.14	8.60E-08	1.35E+02
12:28	78.188	90.92	0.19	10.13	8.83E-08	1.32E+02
12:30	80.188	90.91	0.20	10.12	9.05E-08	1.28E+02
12:32	82.188	90.89	0.22	10.10	9.28E-08	1.25E+02
12:34	84.188	90.88	0.23	10.09	9.50E-08	1.22E+02
12:36	86.188	90.87	0.24	10.08	9.73E-08	1.19E+02
12:38	88.188	90.86	0.25	10.07	9.95E-08	1.17E+02
12:40	90.188	90.85	0.26	10.06	1.02E-07	1.14E+02
12:42	92.188	90.84	0.27	10.05	1.04E-07	1.12E+02
12:44	94.188	90.83	0.28	10.04	1.06E-07	1.09E+02
12:46	96.188	90.81	0.30	10.02	1.09E-07	1.07E+02
12:48	98.188	90.80	0.31	10.01	1.11E-07	1.05E+02
13:10	120.110	90.66	0.45	9.87	1.36E-07	8.60E+01
13:30	140.110	90.54	0.57	9.75	1.58E-07	7.39E+01
13:50	160.120	90.41	0.70	9.62	1.81E-07	6.48E+01
14:10	180.120	90.29	0.82	9.50	2.03E-07	5.77E+01
14:30	200.120	90.17	0.94	9.38	2.26E-07	5.20E+01
14:50	220.120	90.06	1.05	9.27	2.48E-07	4.74E+01
15:10	240.120	89.94	1.17	9.15	2.71E-07	4.35E+01

15:30	260.120	89.82	1.29	9.03	2.94E-07	4.03E+01
15:50	280.120	89.71	1.40	8.92	3.16E-07	3.75E+01
16:10	300.120	89.60	1.51	8.81	3.39E-07	3.50E+01
16:30	320.050	89.51	1.60	8.72	3.61E-07	3.29E+01
16:49	340.050	89.41	1.70	8.62	3.84E-07	3.10E+01
17:10	360.050	89.32	1.79	8.53	4.06E-07	2.94E+01
17:30	380.050	89.23	1.88	8.44	4.29E-07	2.79E+01
17:50	400.050	89.14	1.97	8.35	4.52E-07	2.65E+01
18:10	420.050	89.05	2.06	8.26	4.74E-07	2.53E+01
18:30	440.050	88.97	2.14	8.18	4.97E-07	2.42E+01
18:50	460.050	88.89	2.22	8.10	5.19E-07	2.32E+01
19:10	480.050	88.81	2.30	8.02	5.42E-07	2.23E+01
19:30	500.050	88.74	2.37	7.95	5.64E-07	2.14E+01
19:49	520.050	88.67	2.44	7.88	5.87E-07	2.06E+01
20:10	540.050	88.60	2.51	7.81	6.10E-07	1.99E+01
20:30	560.050	88.54	2.57	7.75	6.32E-07	1.92E+01
20:50	580.050	88.47	2.64	7.68	6.55E-07	1.86E+01
21:10	600.050	88.41	2.70	7.62	6.77E-07	1.80E+01
21:30	620.050	88.35	2.76	7.56	7.00E-07	1.75E+01
21:50	640.050	88.29	2.82	7.50	7.22E-07	1.70E+01
22:10	660.050	88.23	2.88	7.44	7.45E-07	1.65E+01
22:30	680.050	88.17	2.94	7.38	7.68E-07	1.60E+01
22:49	700.050	88.12	2.99	7.33	7.90E-07	1.56E+01
23:10	720.050	88.06	3.05	7.27	8.13E-07	1.52E+01
23:30	740.050	88.00	3.11	7.21	8.35E-07	1.48E+01
23:50	760.100	87.95	3.16	7.16	8.58E-07	1.44E+01
00:10	780.100	87.90	3.21	7.11	8.81E-07	1.41E+01
00:30	800.100	87.85	3.26	7.06	9.03E-07	1.38E+01
00:50	820.100	87.80	3.31	7.01	9.26E-07	1.35E+01
01:10	840.100	87.75	3.36	6.96	9.48E-07	1.32E+01
01:30	860.100	87.70	3.41	6.91	9.71E-07	1.29E+01
01:50	880.100	87.66	3.45	6.87	9.93E-07	1.26E+01
02:10	900.100	87.61	3.50	6.82	1.02E-06	1.23E+01
02:30	920.100	87.57	3.54	6.78	1.04E-06	1.21E+01
02:50	940.100	87.52	3.59	6.73	1.06E-06	1.19E+01
03:10	960.100	87.48	3.63	6.69	1.08E-06	1.16E+01
03:30	980.100	87.43	3.68	6.64	1.11E-06	1.14E+01
03:50	1000.100	87.39	3.72	6.60	1.13E-06	1.12E+01
04:50	1060.300	87.27	3.84	6.48	1.20E-06	1.06E+01
05:50	1120.300	87.15	3.96	6.36	1.26E-06	1.01E+01
06:50	1180.300	87.04	4.07	6.25	1.33E-06	9.65E+00
07:50	1240.300	86.94	4.17	6.15	1.40E-06	9.23E+00
08:50	1300.300	86.86	4.25	6.07	1.47E-06	8.85E+00
09:50	1360.300	86.77	4.34	5.98	1.54E-06	8.51E+00
10:50	1420.300	86.68	4.43	5.89	1.60E-06	8.19E+00
11:50	1480.300	86.59	4.52	5.80	1.67E-06	7.90E+00
12:50	1540.300	86.50	4.61	5.71	1.74E-06	7.63E+00
13:50	1600.300	86.40	4.71	5.61	1.81E-06	7.38E+00
14:50	1660.300	86.34	4.77	5.55	1.87E-06	7.15E+00
15:50	1720.100	86.24	4.87	5.45	1.94E-06	6.94E+00
16:50	1780.100	86.16	4.95	5.37	2.01E-06	6.74E+00
17:50	1840.100	86.08	5.03	5.29	2.08E-06	6.55E+00
18:50	1900.100	86.01	5.10	5.22	2.14E-06	6.37E+00
19:50	1960.100	85.94	5.17	5.15	2.21E-06	6.21E+00
20:50	2020.100	85.88	5.23	5.09	2.28E-06	6.05E+00
21:50	2080.100	85.82	5.29	5.03	2.35E-06	5.91E+00

22:50	2140.100	85.76	5.35	4.97	2.42E-06	5.77E+00
23:50	2200.100	85.70	5.41	4.91	2.48E-06	5.64E+00
00:50	2260.100	85.63	5.48	4.84	2.55E-06	5.52E+00
01:50	2320.100	85.58	5.53	4.79	2.62E-06	5.40E+00
02:50	2380.100	85.51	5.60	4.72	2.69E-06	5.29E+00
03:50	2440.100	85.46	5.65	4.67	2.75E-06	5.18E+00
04:50	2500.100	85.40	5.71	4.61	2.82E-06	5.08E+00
05:50	2560.100	85.35	5.76	4.56	2.89E-06	4.99E+00
06:50	2620.100	85.29	5.82	4.50	2.96E-06	4.90E+00
07:50	2680.100	85.24	5.87	4.45	3.03E-06	4.81E+00
08:50	2740.200	85.20	5.91	4.41	3.09E-06	4.73E+00
09:50	2800.200	85.16	5.95	4.37	3.16E-06	4.65E+00
10:50	2860.200	85.11	6.00	4.32	3.23E-06	4.57E+00
11:50	2920.100	85.06	6.05	4.27	3.30E-06	4.50E+00
12:50	2980.200	85.01	6.10	4.22	3.36E-06	4.43E+00
13:50	3040.200	84.94	6.17	4.15	3.43E-06	4.36E+00
14:50	3100.200	84.91	6.20	4.12	3.50E-06	4.29E+00
15:50	3160.200	84.84	6.27	4.05	3.57E-06	4.23E+00
16:50	3220.200	84.80	6.31	4.01	3.63E-06	4.17E+00
17:50	3280.200	84.75	6.36	3.96	3.70E-06	4.11E+00
18:50	3340.200	84.71	6.40	3.92	3.77E-06	4.06E+00
19:50	3400.200	84.67	6.44	3.88	3.84E-06	4.00E+00
20:50	3460.200	84.63	6.48	3.84	3.91E-06	3.95E+00
21:50	3520.200	84.60	6.51	3.81	3.97E-06	3.90E+00
22:50	3580.200	84.56	6.55	3.77	4.04E-06	3.85E+00
23:50	3640.200	84.53	6.58	3.74	4.11E-06	3.80E+00
00:50	3700.200	84.49	6.62	3.70	4.18E-06	3.76E+00
01:50	3760.200	84.45	6.66	3.66	4.24E-06	3.72E+00
02:50	3820.200	84.41	6.70	3.62	4.31E-06	3.67E+00
03:50	3880.200	84.37	6.74	3.58	4.38E-06	3.63E+00
04:50	3940.200	84.33	6.78	3.54	4.45E-06	3.59E+00
05:50	4000.200	84.29	6.82	3.50	4.52E-06	3.55E+00
06:50	4060.200	84.26	6.85	3.47	4.58E-06	3.51E+00
07:50	4120.200	84.22	6.89	3.43	4.65E-06	3.48E+00
08:50	4180.200	84.20	6.91	3.41	4.72E-06	3.44E+00
09:50	4240.200	84.18	6.93	3.39	4.79E-06	3.41E+00
10:50	4300.200	-999.99	1091.10	1080.78	4.85E-06	3.37E+00
11:04	4314.800	-999.99	1091.10	1080.78	4.87E-06	3.37E+00

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 7 INPUT 5
RADIUS: 1012.704 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 80.33 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
09:00	0.000	80.33	0.00	0.00E+00
09:00	0.017	-99.99	180.32	1.15E-11
09:00	0.034	-99.99	180.32	2.30E-11
09:00	0.050	-99.99	180.32	3.39E-11
09:00	0.067	-99.99	180.32	4.54E-11
09:00	0.084	-99.99	180.32	5.69E-11
09:00	0.100	-99.99	180.32	6.77E-11
09:00	0.117	-99.99	180.32	7.92E-11
09:00	0.134	-99.99	180.32	9.07E-11
09:00	0.150	-99.99	180.32	1.02E-10
09:00	0.167	-99.99	180.32	1.13E-10
09:00	0.257	80.33	0.00	1.74E-10
09:00	0.340	80.33	0.00	2.30E-10
09:00	0.424	80.33	0.00	2.87E-10
09:00	0.507	80.33	0.00	3.43E-10
09:00	0.590	80.33	0.00	4.00E-10
09:00	0.674	80.33	0.00	4.56E-10
09:00	0.757	80.33	0.00	5.13E-10
09:00	0.840	80.33	0.00	5.69E-10
09:00	0.924	80.33	0.00	6.26E-10
09:01	1.007	80.33	0.00	6.82E-10
09:01	1.414	80.33	0.00	9.57E-10
09:01	1.748	80.33	0.00	1.18E-09
09:02	2.081	80.33	0.00	1.41E-09
09:02	2.414	80.33	0.00	1.63E-09
09:02	2.748	80.33	0.00	1.86E-09
09:03	3.081	80.33	0.00	2.09E-09
09:03	3.415	80.33	0.00	2.31E-09
09:03	3.748	80.33	0.00	2.54E-09
09:04	4.081	80.33	0.00	2.76E-09
09:04	4.414	80.33	0.00	2.99E-09
09:04	4.748	80.33	0.00	3.22E-09
09:05	5.081	80.33	0.00	3.44E-09
09:05	5.414	80.33	0.00	3.67E-09
09:05	5.748	80.33	0.00	3.89E-09
09:06	6.081	80.33	0.00	4.12E-09
09:06	6.415	80.33	0.00	4.34E-09
09:06	6.748	80.33	0.00	4.57E-09
09:07	7.081	80.33	0.00	4.79E-09
09:07	7.415	80.33	0.00	5.02E-09
09:07	7.748	80.33	0.00	5.25E-09

09:08	8.081	80.33	0.00	5.47E-09
09:08	8.415	80.33	0.00	5.70E-09
09:08	8.748	80.33	0.00	5.92E-09
09:09	9.081	80.33	0.00	6.15E-09
09:09	9.414	80.33	0.00	6.37E-09
09:09	9.748	80.33	0.00	6.60E-09
09:10	10.081	80.33	0.00	6.83E-09
09:12	12.108	80.33	0.00	8.20E-09
09:14	14.152	80.33	0.00	9.58E-09
09:16	16.152	80.33	0.00	1.09E-08
09:18	18.152	80.33	0.00	1.23E-08
09:20	20.152	80.33	0.00	1.36E-08
09:22	22.152	80.33	0.00	1.50E-08
09:24	24.152	80.33	0.00	1.64E-08
09:26	26.152	80.33	0.00	1.77E-08
09:28	28.215	80.33	0.00	1.91E-08
09:30	30.197	80.33	0.00	2.04E-08
09:32	32.197	80.33	0.00	2.18E-08
09:34	34.197	80.34	-0.01	2.32E-08
09:36	36.197	80.34	-0.01	2.45E-08
09:38	38.197	80.34	-0.01	2.59E-08
09:40	40.197	80.33	0.00	2.72E-08
09:42	42.197	80.34	-0.01	2.86E-08
09:44	44.197	80.34	-0.01	2.99E-08
09:46	46.197	80.34	-0.01	3.13E-08
09:48	48.197	80.34	-0.01	3.26E-08
09:50	50.197	80.34	-0.01	3.40E-08
09:52	52.197	80.34	-0.01	3.53E-08
09:54	54.197	80.34	-0.01	3.67E-08
09:56	56.217	80.34	-0.01	3.81E-08
09:58	58.100	80.34	-0.01	3.93E-08
10:00	60.245	80.34	-0.01	4.08E-08
10:02	62.245	80.34	-0.01	4.21E-08
10:04	64.245	80.34	-0.01	4.35E-08
10:06	66.245	80.34	-0.01	4.49E-08
10:08	68.245	80.34	-0.01	4.62E-08
10:10	70.245	80.34	-0.01	4.76E-08
10:12	72.245	80.34	-0.01	4.89E-08
10:14	74.245	80.34	-0.01	5.03E-08
10:16	76.245	80.34	-0.01	5.16E-08
10:18	78.245	80.34	-0.01	5.30E-08
10:20	80.245	80.34	-0.01	5.43E-08
10:22	82.245	80.34	-0.01	5.57E-08
10:24	84.245	80.34	-0.01	5.70E-08
10:26	86.245	80.34	-0.01	5.84E-08
10:28	88.245	80.34	-0.01	5.98E-08
10:30	90.245	80.34	-0.01	6.11E-08
10:32	92.245	80.34	-0.01	6.25E-08
10:34	94.245	80.34	-0.01	6.38E-08
10:36	96.245	80.34	-0.01	6.52E-08
10:38	98.245	80.34	-0.01	6.65E-08
11:00	120.210	80.34	-0.01	8.14E-08
11:20	140.210	80.35	-0.02	9.49E-08
11:40	160.210	80.35	-0.02	1.08E-07
12:00	180.220	80.35	-0.02	1.22E-07
12:20	200.220	80.35	-0.02	1.36E-07

12:40	220.220	80.35	-0.02	1.49E-07
13:00	240.220	80.36	-0.03	1.63E-07
13:20	260.220	80.36	-0.03	1.76E-07
13:40	280.230	80.37	-0.04	1.90E-07
14:00	300.230	80.37	-0.04	2.03E-07
14:20	320.230	80.37	-0.04	2.17E-07
14:40	340.180	80.38	-0.05	2.30E-07
15:00	360.100	80.38	-0.05	2.44E-07
15:20	380.100	80.39	-0.06	2.57E-07
15:40	400.100	80.39	-0.06	2.71E-07
16:00	420.170	80.39	-0.06	2.85E-07
16:20	440.250	80.40	-0.07	2.98E-07
16:40	460.200	80.40	-0.07	3.12E-07
17:00	480.170	80.41	-0.08	3.25E-07
17:20	500.170	80.41	-0.08	3.39E-07
17:40	520.130	80.42	-0.09	3.52E-07
18:00	540.120	80.43	-0.10	3.66E-07
18:20	560.220	80.43	-0.10	3.79E-07
18:40	580.080	80.44	-0.11	3.93E-07
19:00	600.220	80.45	-0.12	4.06E-07
19:20	620.230	80.45	-0.12	4.20E-07
19:40	640.220	80.47	-0.14	4.34E-07
20:00	660.220	80.47	-0.14	4.47E-07
20:20	680.130	80.48	-0.15	4.61E-07
20:40	700.120	80.49	-0.16	4.74E-07
21:00	720.230	80.49	-0.16	4.88E-07
21:20	740.300	80.51	-0.18	5.01E-07
21:40	760.230	80.51	-0.18	5.15E-07
22:00	780.230	80.52	-0.19	5.28E-07
22:20	800.230	80.53	-0.20	5.42E-07
22:40	820.180	80.54	-0.21	5.55E-07
23:00	840.570	80.55	-0.22	5.69E-07
23:20	860.180	80.56	-0.23	5.82E-07
23:40	880.080	80.57	-0.24	5.96E-07
00:00	900.170	80.58	-0.25	6.10E-07
00:20	920.170	80.59	-0.26	6.23E-07
00:40	940.170	80.60	-0.27	6.37E-07
01:00	960.170	80.61	-0.28	6.50E-07
01:20	980.170	80.62	-0.29	6.64E-07
01:40	1000.200	80.63	-0.30	6.77E-07
02:40	1060.300	80.65	-0.32	7.18E-07
03:40	1120.300	80.68	-0.35	7.59E-07
04:40	1180.300	80.71	-0.38	7.99E-07
05:40	1240.300	80.73	-0.40	8.40E-07
06:40	1300.300	80.76	-0.43	8.80E-07
07:40	1360.200	80.79	-0.46	9.21E-07
08:40	1420.200	80.81	-0.48	9.62E-07
09:40	1480.200	80.84	-0.51	1.00E-06
10:40	1540.200	80.86	-0.53	1.04E-06
11:40	1600.300	80.88	-0.55	1.08E-06
12:40	1660.300	80.89	-0.56	1.12E-06
13:40	1720.200	80.89	-0.56	1.16E-06
14:40	1780.300	80.90	-0.57	1.21E-06
15:40	1840.300	80.92	-0.59	1.25E-06
16:40	1900.300	80.92	-0.59	1.29E-06
17:40	1960.200	80.94	-0.61	1.33E-06

18:40	2020.200	80.97	-0.64	1.37E-06
19:40	2080.200	80.99	-0.66	1.41E-06
20:40	2140.200	81.02	-0.69	1.45E-06
21:40	2200.300	81.05	-0.72	1.49E-06
22:40	2260.300	81.07	-0.74	1.53E-06
23:40	2320.200	81.10	-0.77	1.57E-06
00:40	2380.200	81.12	-0.79	1.61E-06
01:40	2440.200	81.14	-0.81	1.65E-06
02:40	2500.200	81.17	-0.84	1.69E-06
03:40	2560.200	81.19	-0.86	1.73E-06
04:40	2620.200	81.21	-0.88	1.77E-06
05:40	2680.200	81.23	-0.90	1.81E-06
06:40	2740.200	81.26	-0.93	1.86E-06
07:40	2800.200	81.27	-0.94	1.90E-06
08:40	2860.300	81.30	-0.97	1.94E-06
09:40	2920.300	81.32	-0.99	1.98E-06
10:40	2980.300	81.34	-1.01	2.02E-06
11:40	3040.200	81.36	-1.03	2.06E-06
12:40	3100.200	81.39	-1.06	2.10E-06
13:40	3160.300	81.41	-1.08	2.14E-06
14:40	3220.300	81.43	-1.10	2.18E-06
15:40	3280.200	81.45	-1.12	2.22E-06
16:40	3340.200	81.47	-1.14	2.26E-06
17:40	3400.300	81.49	-1.16	2.30E-06
18:40	3460.300	81.51	-1.18	2.34E-06
19:40	3520.300	81.53	-1.20	2.38E-06
20:40	3580.200	81.55	-1.22	2.42E-06
21:40	3640.200	81.57	-1.24	2.46E-06
22:40	3700.200	81.59	-1.26	2.51E-06
23:40	3760.200	81.61	-1.28	2.55E-06
00:40	3820.200	81.63	-1.30	2.59E-06
01:40	3880.200	81.65	-1.32	2.63E-06
02:40	3940.200	81.67	-1.34	2.67E-06
03:40	4000.200	81.68	-1.35	2.71E-06
04:40	4060.200	81.70	-1.37	2.75E-06
05:40	4120.200	81.72	-1.39	2.79E-06
06:40	4180.200	81.74	-1.41	2.83E-06
07:40	4240.300	81.76	-1.43	2.87E-06
08:40	4300.300	81.78	-1.45	2.91E-06
09:40	4360.700	81.80	-1.47	2.95E-06
10:40	4420.300	81.82	-1.49	2.99E-06
11:40	4480.300	81.84	-1.51	3.03E-06
12:40	4540.300	81.86	-1.53	3.07E-06
13:40	4600.300	81.87	-1.54	3.12E-06
14:40	4660.300	81.89	-1.56	3.16E-06
15:40	4720.300	81.90	-1.57	3.20E-06
16:40	4780.300	81.92	-1.59	3.24E-06
17:40	4840.300	81.91	-1.58	3.28E-06
18:40	4900.300	81.93	-1.60	3.32E-06
19:40	4960.300	81.95	-1.62	3.36E-06
20:40	5020.300	81.97	-1.64	3.40E-06
21:40	5080.300	81.99	-1.66	3.44E-06
22:40	5140.300	82.00	-1.67	3.48E-06
23:40	5200.300	82.02	-1.69	3.52E-06
00:40	5260.300	82.03	-1.70	3.56E-06
01:40	5320.300	82.05	-1.72	3.60E-06

02:40	5380.300	82.06	-1.73	3.64E-06
03:40	5440.300	82.07	-1.74	3.68E-06
04:40	5500.300	82.09	-1.76	3.72E-06
05:40	5560.300	82.10	-1.77	3.77E-06
06:40	5620.300	82.11	-1.78	3.81E-06
07:40	5680.300	82.14	-1.81	3.85E-06
08:40	5740.300	82.15	-1.82	3.89E-06
09:40	5800.300	82.17	-1.84	3.93E-06
10:40	5860.300	82.19	-1.86	3.97E-06
11:40	5920.300	82.20	-1.87	4.01E-06
12:40	5980.300	82.20	-1.87	4.05E-06
13:40	6040.300	82.22	-1.89	4.09E-06
14:40	6100.300	82.22	-1.89	4.13E-06
15:40	6160.500	82.23	-1.90	4.17E-06
16:40	6220.300	82.24	-1.91	4.21E-06
17:40	6280.300	82.25	-1.92	4.25E-06
18:40	6340.300	82.26	-1.93	4.29E-06
19:40	6400.400	82.27	-1.94	4.33E-06
20:40	6460.200	82.28	-1.95	4.37E-06
21:40	6520.200	82.29	-1.96	4.42E-06
22:40	6580.300	82.31	-1.98	4.46E-06
23:40	6640.300	82.32	-1.99	4.50E-06
00:40	6700.300	82.33	-2.00	4.54E-06
01:40	6760.300	82.32	-1.99	4.58E-06
02:40	6820.300	82.36	-2.03	4.62E-06
03:40	6880.300	82.37	-2.04	4.66E-06
04:40	6940.300	82.38	-2.05	4.70E-06
05:40	7000.300	82.39	-2.06	4.74E-06
06:40	7060.300	82.41	-2.08	4.78E-06
07:40	7120.300	82.41	-2.08	4.82E-06
08:40	7180.300	82.36	-2.03	4.86E-06
09:40	7240.300	82.29	-1.96	4.90E-06
10:40	7300.300	82.24	-1.91	4.94E-06
11:40	7360.300	82.13	-1.80	4.98E-06
12:40	7420.300	82.18	-1.85	5.02E-06
13:40	7480.300	82.21	-1.88	5.07E-06
14:40	7540.300	82.27	-1.94	5.11E-06
15:40	7600.300	82.26	-1.93	5.15E-06
16:40	7660.300	82.26	-1.93	5.19E-06
17:40	7720.300	82.26	-1.93	5.23E-06
18:40	7780.200	82.15	-1.82	5.27E-06
19:40	7840.200	82.12	-1.79	5.31E-06
20:40	7900.300	82.14	-1.81	5.35E-06
21:40	7960.300	82.07	-1.74	5.39E-06
22:40	8020.300	82.02	-1.69	5.43E-06
23:40	8080.300	81.94	-1.61	5.47E-06
00:40	8140.300	81.87	-1.54	5.51E-06
01:40	8200.300	81.83	-1.50	5.55E-06
02:40	8260.300	81.87	-1.54	5.59E-06
03:40	8320.300	81.84	-1.51	5.63E-06
04:40	8380.300	81.82	-1.49	5.67E-06
05:40	8440.300	81.82	-1.49	5.72E-06
06:40	8500.300	81.87	-1.54	5.76E-06
07:40	8560.200	81.92	-1.59	5.80E-06
08:40	8620.300	81.90	-1.57	5.84E-06
09:00	8640.600	81.90	-1.57	5.85E-06

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 7 INPUT 5
RADIUS: 1012.704 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 80.33 FEET

TIME	E.T. (MIN)	LEVEL	Delta H	t/r2
10:25	8725.000	81.92	-1.59	5.91E-06
10:35	8735.071	81.93	-1.60	5.91E-06
10:45	8745.070	81.93	-1.60	5.92E-06
10:55	8755.072	81.92	-1.59	5.93E-06
11:05	8765.072	81.90	-1.57	5.94E-06
11:15	8775.072	81.88	-1.55	5.94E-06
11:25	8785.072	81.93	-1.60	5.95E-06
11:35	8795.072	81.95	-1.62	5.96E-06
11:45	8805.072	81.97	-1.64	5.96E-06
11:55	8815.102	81.98	-1.65	5.97E-06
12:05	8825.090	81.98	-1.65	5.98E-06
12:15	8835.090	82.01	-1.68	5.98E-06
12:25	8845.090	82.01	-1.68	5.99E-06
12:35	8855.090	82.04	-1.71	6.00E-06
12:45	8865.090	82.05	-1.72	6.00E-06
12:55	8875.120	82.08	-1.75	6.01E-06
13:04	8884.970	82.06	-1.73	6.02E-06
13:14	8894.970	82.08	-1.75	6.02E-06
13:25	8904.970	82.11	-1.78	6.03E-06
13:34	8914.970	82.14	-1.81	6.04E-06
13:45	8924.970	82.15	-1.82	6.04E-06
13:54	8934.970	82.17	-1.84	6.05E-06
14:05	8944.970	82.16	-1.83	6.06E-06
14:14	8955.020	82.18	-1.85	6.06E-06
14:25	8965.080	82.20	-1.87	6.07E-06
14:35	8975.080	82.22	-1.89	6.08E-06
14:45	8985.080	82.23	-1.90	6.08E-06
14:55	8995.080	82.25	-1.92	6.09E-06
15:05	9005.080	82.27	-1.94	6.10E-06
15:15	9015.080	82.28	-1.95	6.10E-06
15:25	9025.080	82.29	-1.96	6.11E-06
15:35	9035.080	82.29	-1.96	6.12E-06
15:45	9045.080	82.30	-1.97	6.12E-06
15:55	9055.080	82.30	-1.97	6.13E-06
16:04	9065.020	82.31	-1.98	6.14E-06
16:15	9075.020	82.32	-1.99	6.14E-06
16:25	9084.970	82.32	-1.99	6.15E-06
16:35	9095.080	82.33	-2.00	6.16E-06
16:45	9105.080	82.33	-2.00	6.17E-06
16:55	9115.080	82.35	-2.02	6.17E-06

ADJUSTED DATA

17:05	9125.080	82.36	-2.03	6.18E-06
17:15	9135.080	82.35	-2.02	6.19E-06
17:25	9145.080	82.35	-2.02	6.19E-06
17:35	9155.080	82.33	-2.00	6.20E-06
17:45	9165.080	82.32	-1.99	6.21E-06
17:55	9175.080	82.34	-2.01	6.21E-06
18:05	9185.080	82.33	-2.00	6.22E-06
18:15	9195.080	82.33	-2.00	6.23E-06
18:25	9205.080	82.32	-1.99	6.23E-06
18:35	9215.080	82.31	-1.98	6.24E-06
18:45	9225.080	82.31	-1.98	6.25E-06
18:55	9235.080	82.30	-1.97	6.25E-06
19:05	9245.080	82.30	-1.97	6.26E-06
19:15	9255.080	82.29	-1.96	6.27E-06
19:25	9265.080	82.29	-1.96	6.27E-06
19:35	9275.070	82.29	-1.96	6.28E-06
19:45	9285.080	82.28	-1.95	6.29E-06
19:55	9295.080	82.29	-1.96	6.29E-06
20:05	9305.080	82.28	-1.95	6.30E-06
20:15	9315.080	82.28	-1.95	6.31E-06
20:25	9325.080	82.28	-1.95	6.31E-06
20:35	9335.080	82.28	-1.95	6.32E-06
20:45	9345.080	82.28	-1.95	6.33E-06
20:55	9355.080	82.27	-1.94	6.33E-06
21:05	9365.080	82.26	-1.93	6.34E-06
21:15	9375.080	82.26	-1.93	6.35E-06
21:25	9385.080	82.26	-1.93	6.35E-06
21:35	9395.080	82.26	-1.93	6.36E-06
21:45	9405.080	82.26	-1.93	6.37E-06
21:55	9415.080	82.26	-1.93	6.38E-06
22:05	9425.080	82.26	-1.93	6.38E-06
22:15	9435.080	82.25	-1.92	6.39E-06
22:25	9445.080	82.25	-1.92	6.40E-06
22:35	9455.080	82.25	-1.92	6.40E-06
22:45	9465.080	82.24	-1.91	6.41E-06
22:54	9475.020	82.23	-1.90	6.42E-06
23:05	9485.020	82.23	-1.90	6.42E-06
23:14	9495.020	82.22	-1.89	6.43E-06
23:25	9505.020	82.21	-1.88	6.44E-06
23:34	9515.020	82.21	-1.88	6.44E-06
23:45	9525.020	82.21	-1.88	6.45E-06
23:55	9535.020	82.21	-1.88	6.46E-06
00:05	9545.020	82.21	-1.88	6.46E-06
00:15	9555.020	82.21	-1.88	6.47E-06
00:25	9565.030	82.21	-1.88	6.48E-06
00:35	9575.030	82.21	-1.88	6.48E-06
00:44	9585.030	82.20	-1.87	6.49E-06
00:55	9595.030	82.20	-1.87	6.50E-06
01:04	9605.030	82.21	-1.88	6.50E-06
01:15	9615.030	82.21	-1.88	6.51E-06
01:25	9625.030	82.21	-1.88	6.52E-06
01:35	9635.030	82.20	-1.87	6.52E-06
01:45	9645.030	82.20	-1.87	6.53E-06
01:55	9655.030	82.20	-1.87	6.54E-06
02:05	9665.030	82.20	-1.87	6.54E-06
02:14	9675.030	82.20	-1.87	6.55E-06

ADJUSTED DATA

02:25	9685.030	82.20	-1.87	6.56E-06
02:34	9695.030	82.20	-1.87	6.56E-06
02:45	9705.030	82.20	-1.87	6.57E-06
02:55	9715.030	82.21	-1.88	6.58E-06
03:04	9725.000	82.21	-1.88	6.59E-06
03:15	9735.000	82.21	-1.88	6.59E-06
03:24	9745.000	82.21	-1.88	6.60E-06
03:35	9755.100	82.21	-1.88	6.61E-06
03:44	9765.000	82.20	-1.87	6.61E-06
03:55	9775.000	82.20	-1.87	6.62E-06
04:04	9785.000	82.19	-1.86	6.63E-06
04:15	9795.000	82.19	-1.86	6.63E-06
04:25	9805.000	82.18	-1.85	6.64E-06
04:34	9815.000	82.17	-1.84	6.65E-06
04:45	9825.000	82.16	-1.83	6.65E-06
04:54	9835.000	82.15	-1.82	6.66E-06
05:05	9845.000	82.15	-1.82	6.67E-06
05:14	9855.000	82.14	-1.81	6.67E-06
05:25	9865.000	82.14	-1.81	6.68E-06
05:34	9875.000	82.13	-1.80	6.69E-06
05:45	9885.000	82.13	-1.80	6.69E-06
05:55	9895.000	82.12	-1.79	6.70E-06
06:04	9905.000	82.12	-1.79	6.71E-06
06:15	9915.000	82.12	-1.79	6.71E-06
06:24	9925.000	82.11	-1.78	6.72E-06
06:35	9935.000	82.11	-1.78	6.73E-06
06:44	9945.000	82.11	-1.78	6.73E-06
06:55	9955.000	82.10	-1.77	6.74E-06
07:05	9965.100	82.10	-1.77	6.75E-06
07:15	9975.100	82.10	-1.77	6.75E-06
07:25	9985.100	82.10	-1.77	6.76E-06
07:35	9995.100	82.11	-1.78	6.77E-06
07:45	10005.100	82.18	-1.85	6.77E-06
07:55	10015.100	82.16	-1.83	6.78E-06
08:05	10025.100	82.15	-1.82	6.79E-06
08:15	10035.100	82.15	-1.82	6.80E-06
08:25	10045.100	82.16	-1.83	6.80E-06
08:35	10055.100	82.17	-1.84	6.81E-06
08:45	10065.100	82.19	-1.86	6.82E-06
08:55	10075.000	82.20	-1.87	6.82E-06
09:04	10085.000	82.22	-1.89	6.83E-06
09:15	10095.000	82.24	-1.91	6.84E-06
09:24	10105.000	82.27	-1.94	6.84E-06
09:28	10108.200	82.28	-1.95	6.84E-06

TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 7 INPUT 5
RADIUS: 1012.704 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 80.33 FEET
WATER STOP LEVEL: 83.05 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)	t/r2	t/t'
11:10	0.017	-999.99	1083.04	1080.32	1.15E-11	6.01E+05
11:10	0.034	-999.99	1083.04	1080.32	2.30E-11	3.00E+05
11:10	0.050	-999.99	1083.04	1080.32	3.39E-11	2.04E+05
11:10	0.067	-999.99	1083.04	1080.32	4.54E-11	1.52E+05
11:10	0.084	-999.99	1083.04	1080.32	5.69E-11	1.22E+05
11:10	0.100	-999.99	1083.04	1080.32	6.77E-11	1.02E+05
11:10	0.117	-999.99	1083.04	1080.32	7.92E-11	8.73E+04
11:10	0.134	-999.99	1083.04	1080.32	9.07E-11	7.62E+04
11:10	0.150	-999.99	1083.04	1080.32	1.02E-10	6.81E+04
11:10	0.167	-999.99	1083.04	1080.32	1.13E-10	6.11E+04
11:10	0.257	83.05	0.00	2.72	1.74E-10	3.97E+04
11:10	0.341	83.05	0.00	2.72	2.31E-10	2.99E+04
11:10	0.424	83.05	0.00	2.72	2.87E-10	2.41E+04
11:10	0.507	83.05	0.00	2.72	3.43E-10	2.01E+04
11:10	0.591	83.05	0.00	2.72	4.00E-10	1.73E+04
11:10	0.674	83.05	0.00	2.72	4.56E-10	1.52E+04
11:10	0.757	83.05	0.00	2.72	5.13E-10	1.35E+04
11:10	0.841	83.05	0.00	2.72	5.69E-10	1.21E+04
11:10	0.924	83.05	0.00	2.72	6.26E-10	1.11E+04
11:11	1.007	83.05	0.00	2.72	6.82E-10	1.01E+04
11:11	1.413	83.06	-0.01	2.73	9.57E-10	7.23E+03
11:11	1.747	83.06	-0.01	2.73	1.18E-09	5.85E+03
11:12	2.080	83.06	-0.01	2.73	1.41E-09	4.91E+03
11:12	2.413	83.06	-0.01	2.73	1.63E-09	4.23E+03
11:12	2.747	83.07	-0.02	2.74	1.86E-09	3.72E+03
11:13	3.080	83.07	-0.02	2.74	2.09E-09	3.32E+03
11:13	3.413	83.07	-0.02	2.74	2.31E-09	2.99E+03
11:13	3.747	83.08	-0.03	2.75	2.54E-09	2.73E+03
11:14	4.080	83.08	-0.03	2.75	2.76E-09	2.50E+03
11:14	4.413	83.08	-0.03	2.75	2.99E-09	2.31E+03
11:14	4.747	83.09	-0.04	2.76	3.21E-09	2.15E+03
11:15	5.080	83.09	-0.04	2.76	3.44E-09	2.01E+03
11:15	5.413	83.09	-0.04	2.76	3.67E-09	1.89E+03
11:15	5.747	83.09	-0.04	2.76	3.89E-09	1.78E+03
11:16	6.080	83.10	-0.05	2.77	4.12E-09	1.68E+03
11:16	6.413	83.10	-0.05	2.77	4.34E-09	1.59E+03
11:16	6.747	83.10	-0.05	2.77	4.57E-09	1.51E+03
11:17	7.080	83.10	-0.05	2.77	4.79E-09	1.44E+03
11:17	7.413	83.11	-0.06	2.78	5.02E-09	1.38E+03
11:17	7.747	83.11	-0.06	2.78	5.25E-09	1.32E+03
11:18	8.080	83.11	-0.06	2.78	5.47E-09	1.26E+03
11:18	8.413	83.11	-0.06	2.78	5.70E-09	1.21E+03

11:18	8.747	83.11	-0.06	2.78	5.92E-09	1.17E+03
11:19	9.080	83.11	-0.06	2.78	6.15E-09	1.13E+03
11:19	9.413	83.12	-0.07	2.79	6.37E-09	1.09E+03
11:19	9.747	83.12	-0.07	2.79	6.60E-09	1.05E+03
11:20	10.080	83.12	-0.07	2.79	6.83E-09	1.01E+03
11:22	12.115	83.13	-0.08	2.80	8.20E-09	8.44E+02
11:24	14.115	83.15	-0.10	2.82	9.56E-09	7.24E+02
11:26	16.115	83.17	-0.12	2.84	1.09E-08	6.35E+02
11:28	18.115	83.18	-0.13	2.85	1.23E-08	5.65E+02
11:30	20.115	83.20	-0.15	2.87	1.36E-08	5.09E+02
11:32	22.115	83.22	-0.17	2.89	1.50E-08	4.63E+02
11:34	24.115	83.24	-0.19	2.91	1.63E-08	4.24E+02
11:36	26.115	83.26	-0.21	2.93	1.77E-08	3.92E+02
11:38	28.115	83.27	-0.22	2.94	1.90E-08	3.64E+02
11:40	30.115	83.28	-0.23	2.95	2.04E-08	3.40E+02
11:42	32.115	83.28	-0.23	2.95	2.17E-08	3.19E+02
11:44	34.115	83.29	-0.24	2.96	2.31E-08	3.00E+02
11:46	36.115	83.30	-0.25	2.97	2.45E-08	2.84E+02
11:48	38.115	83.32	-0.27	2.99	2.58E-08	2.69E+02
11:50	40.115	83.32	-0.27	2.99	2.72E-08	2.56E+02
11:52	42.115	83.35	-0.30	3.02	2.85E-08	2.43E+02
11:54	44.115	83.36	-0.31	3.03	2.99E-08	2.32E+02
11:56	46.115	83.38	-0.33	3.05	3.12E-08	2.22E+02
11:58	48.115	83.39	-0.34	3.06	3.26E-08	2.13E+02
12:00	50.115	83.40	-0.35	3.07	3.39E-08	2.05E+02
12:02	52.115	83.41	-0.36	3.08	3.53E-08	1.97E+02
12:04	54.115	83.41	-0.36	3.08	3.66E-08	1.90E+02
12:06	56.115	83.43	-0.38	3.10	3.80E-08	1.83E+02
12:08	58.115	83.44	-0.39	3.11	3.94E-08	1.77E+02
12:10	60.115	83.45	-0.40	3.12	4.07E-08	1.71E+02
12:12	62.102	83.47	-0.42	3.14	4.21E-08	1.65E+02
12:14	64.492	83.49	-0.44	3.16	4.37E-08	1.59E+02
12:16	66.188	83.50	-0.45	3.17	4.48E-08	1.55E+02
12:18	68.188	83.51	-0.46	3.18	4.62E-08	1.51E+02
12:20	70.188	83.52	-0.47	3.19	4.75E-08	1.46E+02
12:22	72.188	83.54	-0.49	3.21	4.89E-08	1.42E+02
12:24	74.188	83.56	-0.51	3.23	5.02E-08	1.39E+02
12:26	76.188	83.57	-0.52	3.24	5.16E-08	1.35E+02
12:28	78.188	83.58	-0.53	3.25	5.29E-08	1.32E+02
12:30	80.188	83.59	-0.54	3.26	5.43E-08	1.28E+02
12:32	82.188	83.60	-0.55	3.27	5.57E-08	1.25E+02
12:34	84.188	83.61	-0.56	3.28	5.70E-08	1.22E+02
12:36	86.188	83.62	-0.57	3.29	5.84E-08	1.19E+02
12:38	88.188	83.64	-0.59	3.31	5.97E-08	1.17E+02
12:40	90.188	83.66	-0.61	3.33	6.11E-08	1.14E+02
12:42	92.188	83.67	-0.62	3.34	6.24E-08	1.12E+02
12:44	94.188	83.68	-0.63	3.35	6.38E-08	1.09E+02
12:46	96.188	83.68	-0.63	3.35	6.51E-08	1.07E+02
12:48	98.188	83.69	-0.64	3.36	6.65E-08	1.05E+02
13:10	120.110	83.75	-0.70	3.42	8.13E-08	8.60E+01
13:30	140.110	83.79	-0.74	3.46	9.49E-08	7.39E+01
13:50	160.120	83.79	-0.74	3.46	1.08E-07	6.48E+01
14:10	180.120	83.93	-0.88	3.60	1.22E-07	5.77E+01
14:30	200.120	83.46	-0.41	3.13	1.36E-07	5.20E+01
14:50	220.120	83.16	-0.11	2.83	1.49E-07	4.74E+01
15:10	240.120	83.13	-0.08	2.80	1.63E-07	4.35E+01

15:30	260.120	83.12	-0.07	2.79	1.76E-07	4.03E+01
15:50	280.120	83.12	-0.07	2.79	1.90E-07	3.75E+01
16:10	300.120	83.11	-0.06	2.78	2.03E-07	3.50E+01
16:30	320.050	83.11	-0.06	2.78	2.17E-07	3.29E+01
16:49	340.050	83.10	-0.05	2.77	2.30E-07	3.10E+01
17:10	360.050	83.09	-0.04	2.76	2.44E-07	2.94E+01
17:30	380.050	83.09	-0.04	2.76	2.57E-07	2.79E+01
17:50	400.050	83.09	-0.04	2.76	2.71E-07	2.65E+01
18:10	420.050	83.08	-0.03	2.75	2.84E-07	2.53E+01
18:30	440.050	83.08	-0.03	2.75	2.98E-07	2.42E+01
18:50	460.050	83.08	-0.03	2.75	3.12E-07	2.32E+01
19:10	480.050	83.08	-0.03	2.75	3.25E-07	2.23E+01
19:30	500.050	83.08	-0.03	2.75	3.39E-07	2.14E+01
19:49	520.050	83.08	-0.03	2.75	3.52E-07	2.06E+01
20:10	540.050	83.08	-0.03	2.75	3.66E-07	1.99E+01
20:30	560.050	83.08	-0.03	2.75	3.79E-07	1.92E+01
20:50	580.050	83.07	-0.02	2.74	3.93E-07	1.86E+01
21:10	600.050	83.07	-0.02	2.74	4.06E-07	1.80E+01
21:30	620.050	83.06	-0.01	2.73	4.20E-07	1.75E+01
21:50	640.050	83.06	-0.01	2.73	4.33E-07	1.70E+01
22:10	660.050	83.06	-0.01	2.73	4.47E-07	1.65E+01
22:30	680.050	83.05	0.00	2.72	4.60E-07	1.60E+01
22:49	700.050	83.05	0.00	2.72	4.74E-07	1.56E+01
23:10	720.050	83.04	0.01	2.71	4.88E-07	1.52E+01
23:30	740.050	83.04	0.01	2.71	5.01E-07	1.48E+01
23:50	760.100	83.03	0.02	2.70	5.15E-07	1.44E+01
00:10	780.100	83.03	0.02	2.70	5.28E-07	1.41E+01
00:30	800.100	83.02	0.03	2.69	5.42E-07	1.38E+01
00:50	820.100	83.01	0.04	2.68	5.55E-07	1.35E+01
01:10	840.100	83.01	0.04	2.68	5.69E-07	1.32E+01
01:30	860.100	83.00	0.05	2.67	5.82E-07	1.29E+01
01:50	880.100	82.99	0.06	2.66	5.96E-07	1.26E+01
02:10	900.100	82.99	0.06	2.66	6.09E-07	1.23E+01
02:30	920.100	82.98	0.07	2.65	6.23E-07	1.21E+01
02:50	940.100	82.97	0.08	2.64	6.37E-07	1.19E+01
03:10	960.100	82.97	0.08	2.64	6.50E-07	1.16E+01
03:30	980.100	82.96	0.09	2.63	6.64E-07	1.14E+01
03:50	1000.100	82.95	0.10	2.62	6.77E-07	1.12E+01
04:50	1060.300	82.93	0.12	2.60	7.18E-07	1.06E+01
05:50	1120.300	82.91	0.14	2.58	7.59E-07	1.01E+01
06:50	1180.300	82.89	0.16	2.56	7.99E-07	9.65E+00
07:50	1240.300	82.87	0.18	2.54	8.40E-07	9.23E+00
08:50	1300.300	82.85	0.20	2.52	8.80E-07	8.85E+00
09:50	1360.300	82.84	0.21	2.51	9.21E-07	8.51E+00
10:50	1420.300	82.83	0.22	2.50	9.62E-07	8.19E+00
11:50	1480.300	82.80	0.25	2.47	1.00E-06	7.90E+00
12:50	1540.300	82.79	0.26	2.46	1.04E-06	7.63E+00
13:50	1600.300	82.77	0.28	2.44	1.08E-06	7.38E+00
14:50	1660.300	82.74	0.31	2.41	1.12E-06	7.15E+00
15:50	1720.100	82.71	0.34	2.38	1.16E-06	6.94E+00
16:50	1780.100	82.69	0.36	2.36	1.21E-06	6.74E+00
17:50	1840.100	82.67	0.38	2.34	1.25E-06	6.55E+00
18:50	1900.100	82.65	0.40	2.32	1.29E-06	6.37E+00
19:50	1960.100	82.63	0.42	2.30	1.33E-06	6.21E+00
20:50	2020.100	82.62	0.43	2.29	1.37E-06	6.05E+00
21:50	2080.100	82.60	0.45	2.27	1.41E-06	5.91E+00

22:50	2140.100	82.59	0.46	2.26	1.45E-06	5.77E+00
23:50	2200.100	82.58	0.47	2.25	1.49E-06	5.64E+00
00:50	2260.100	82.56	0.49	2.23	1.53E-06	5.52E+00
01:50	2320.100	82.54	0.51	2.21	1.57E-06	5.40E+00
02:50	2380.100	82.53	0.52	2.20	1.61E-06	5.29E+00
03:50	2440.100	82.51	0.54	2.18	1.65E-06	5.18E+00
04:50	2500.100	82.49	0.56	2.16	1.69E-06	5.08E+00
05:50	2560.100	82.47	0.58	2.14	1.73E-06	4.99E+00
06:50	2620.100	82.46	0.59	2.13	1.77E-06	4.90E+00
07:50	2680.100	82.44	0.61	2.11	1.81E-06	4.81E+00
08:50	2740.200	82.42	0.63	2.09	1.86E-06	4.73E+00
09:50	2800.200	82.41	0.64	2.08	1.90E-06	4.65E+00
10:50	2860.200	82.39	0.66	2.06	1.94E-06	4.57E+00
11:50	2920.100	82.37	0.68	2.04	1.98E-06	4.50E+00
12:50	2980.200	82.37	0.68	2.04	2.02E-06	4.43E+00
13:50	3040.200	82.34	0.71	2.01	2.06E-06	4.36E+00
14:50	3100.200	82.33	0.72	2.00	2.10E-06	4.29E+00
15:50	3160.200	82.31	0.74	1.98	2.14E-06	4.23E+00
16:50	3220.200	82.29	0.76	1.96	2.18E-06	4.17E+00
17:50	3280.200	82.27	0.78	1.94	2.22E-06	4.11E+00
18:50	3340.200	82.26	0.79	1.93	2.26E-06	4.06E+00
19:50	3400.200	82.26	0.79	1.93	2.30E-06	4.00E+00
20:50	3460.200	82.26	0.79	1.93	2.34E-06	3.95E+00
21:50	3520.200	82.25	0.80	1.92	2.38E-06	3.90E+00
22:50	3580.200	82.24	0.81	1.91	2.42E-06	3.85E+00
23:50	3640.200	82.23	0.82	1.90	2.46E-06	3.80E+00
00:50	3700.200	82.21	0.84	1.88	2.51E-06	3.76E+00
01:50	3760.200	82.19	0.86	1.86	2.55E-06	3.72E+00
02:50	3820.200	82.17	0.88	1.84	2.59E-06	3.67E+00
03:50	3880.200	82.16	0.89	1.83	2.63E-06	3.63E+00
04:50	3940.200	82.14	0.91	1.81	2.67E-06	3.59E+00
05:50	4000.200	82.12	0.93	1.79	2.71E-06	3.55E+00
06:50	4060.200	82.10	0.95	1.77	2.75E-06	3.51E+00
07:50	4120.200	82.10	0.95	1.77	2.79E-06	3.48E+00
08:50	4180.200	82.08	0.97	1.75	2.83E-06	3.44E+00
09:50	4240.200	82.07	0.98	1.74	2.87E-06	3.41E+00
10:50	4300.200	-999.99	1083.04	1080.32	2.91E-06	3.37E+00
11:04	4314.800	-999.99	1083.04	1080.32	2.92E-06	3.37E+00

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : P 10-4 INPUT 8
RADIUS: 20.053 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 38.82 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	38.74	0.08
10:35	8735.071	38.74	0.08
10:45	8745.070	38.74	0.08
10:55	8755.072	38.74	0.08
11:05	8765.072	38.74	0.08
11:15	8775.072	38.74	0.08
11:25	8785.072	38.74	0.08
11:35	8795.072	38.74	0.08
11:45	8805.072	38.74	0.08
11:55	8815.102	38.74	0.08
12:05	8825.090	38.74	0.08
12:15	8835.090	38.74	0.08
12:25	8845.090	38.74	0.08
12:35	8855.090	38.73	0.09
12:45	8865.090	38.73	0.09
12:55	8875.120	38.73	0.09
13:04	8884.970	38.73	0.09
13:14	8894.970	38.73	0.09
13:25	8904.970	38.73	0.09
13:34	8914.970	38.73	0.09
13:45	8924.970	38.73	0.09
13:54	8934.970	38.73	0.09
14:05	8944.970	38.73	0.09
14:14	8955.020	38.73	0.09
14:25	8965.080	38.73	0.09
14:35	8975.080	38.73	0.09
14:45	8985.080	38.73	0.09
14:55	8995.080	38.73	0.09
15:05	9005.080	38.73	0.09
15:15	9015.080	38.73	0.09
15:25	9025.080	38.73	0.09
15:35	9035.080	38.73	0.09
15:45	9045.080	38.73	0.09
15:55	9055.080	38.73	0.09
16:04	9065.020	38.73	0.09
16:15	9075.020	38.73	0.09
16:25	9084.970	38.73	0.09
16:35	9095.080	38.73	0.09
16:45	9105.080	38.73	0.09
16:55	9115.080	38.73	0.09

ADJUSTED DATA

17:05	9125.080	38.73	0.09
17:15	9135.080	38.73	0.09
17:25	9145.080	38.72	0.10
17:35	9155.080	38.72	0.10
17:45	9165.080	38.72	0.10
17:55	9175.080	38.72	0.10
18:05	9185.080	38.72	0.10
18:15	9195.080	38.72	0.10
18:25	9205.080	38.72	0.10
18:35	9215.080	38.72	0.10
18:45	9225.080	38.72	0.10
18:55	9235.080	38.72	0.10
19:05	9245.080	38.72	0.10
19:15	9255.080	38.72	0.10
19:25	9265.080	38.72	0.10
19:35	9275.070	38.72	0.10
19:45	9285.080	38.72	0.10
19:55	9295.080	38.72	0.10
20:05	9305.080	38.72	0.10
20:15	9315.080	38.72	0.10
20:25	9325.080	38.72	0.10
20:35	9335.080	38.72	0.10
20:45	9345.080	38.72	0.10
20:55	9355.080	38.72	0.10
21:05	9365.080	38.72	0.10
21:15	9375.080	38.72	0.10
21:25	9385.080	38.72	0.10
21:35	9395.080	38.72	0.10
21:45	9405.080	38.72	0.10
21:55	9415.080	38.72	0.10
22:05	9425.080	38.72	0.10
22:15	9435.080	38.72	0.10
22:25	9445.080	38.72	0.10
22:35	9455.080	38.72	0.10
22:45	9465.080	38.72	0.10
22:54	9475.020	38.72	0.10
23:05	9485.020	38.71	0.11
23:14	9495.020	38.72	0.10
23:25	9505.020	38.72	0.10
23:34	9515.020	38.71	0.11
23:45	9525.020	38.71	0.11
23:55	9535.020	38.71	0.11
00:05	9545.020	38.71	0.11
00:15	9555.020	38.71	0.11
00:25	9565.030	38.71	0.11
00:35	9575.030	38.71	0.11
00:44	9585.030	38.71	0.11
00:55	9595.030	38.71	0.11
01:04	9605.030	38.71	0.11
01:15	9615.030	38.71	0.11
01:25	9625.030	38.71	0.11
01:35	9635.030	38.71	0.11
01:45	9645.030	38.71	0.11
01:55	9655.030	38.71	0.11
02:05	9665.030	38.71	0.11
02:14	9675.030	38.71	0.11

ADJUSTED DATA

02:25	9685.030	38.71	0.11
02:34	9695.030	38.71	0.11
02:45	9705.030	38.71	0.11
02:55	9715.030	38.71	0.11
03:04	9725.000	38.71	0.11
03:15	9735.000	38.71	0.11
03:24	9745.000	38.71	0.11
03:35	9755.100	38.71	0.11
03:44	9765.000	38.71	0.11
03:55	9775.000	38.71	0.11
04:04	9785.000	38.71	0.11
04:15	9795.000	38.71	0.11
04:25	9805.000	38.71	0.11
04:34	9815.000	38.71	0.11
04:45	9825.000	38.71	0.11
04:54	9835.000	38.71	0.11
05:05	9845.000	38.71	0.11
05:14	9855.000	38.71	0.11
05:25	9865.000	38.70	0.12
05:34	9875.000	38.70	0.12
05:45	9885.000	38.70	0.12
05:55	9895.000	38.70	0.12
06:04	9905.000	38.70	0.12
06:15	9915.000	38.70	0.12
06:24	9925.000	38.70	0.12
06:35	9935.000	38.70	0.12
06:44	9945.000	38.70	0.12
06:55	9955.000	38.70	0.12
07:05	9965.100	38.70	0.12
07:15	9975.100	38.70	0.12
07:25	9985.100	38.70	0.12
07:35	9995.100	38.70	0.12
07:45	10005.100	38.70	0.12
07:55	10015.100	38.70	0.12
08:05	10025.100	38.70	0.12
08:15	10035.100	38.70	0.12
08:25	10045.100	38.70	0.12
08:35	10055.100	38.70	0.12
08:45	10065.100	38.70	0.12
08:55	10075.000	38.70	0.12
09:04	10085.000	38.70	0.12
09:15	10095.000	38.70	0.12
09:24	10105.000	38.70	0.12
09:28	10108.200	38.70	0.12

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: P 10-4 INPUT 8
RADIUS: 20.053 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 38.82 FEET
WATER STOP LEVEL: 38.76 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1038.75	1038.81
11:10	0.034	-999.99	1038.75	1038.81
11:10	0.050	-999.99	1038.75	1038.81
11:10	0.067	-999.99	1038.75	1038.81
11:10	0.084	-999.99	1038.75	1038.81
11:10	0.100	-999.99	1038.75	1038.81
11:10	0.117	-999.99	1038.75	1038.81
11:10	0.134	-999.99	1038.75	1038.81
11:10	0.150	-999.99	1038.75	1038.81
11:10	0.167	-999.99	1038.75	1038.81
11:10	0.257	38.76	0.00	0.06
11:10	0.341	38.76	0.00	0.06
11:10	0.424	38.76	0.00	0.06
11:10	0.507	38.76	0.00	0.06
11:10	0.591	38.76	0.00	0.06
11:10	0.674	38.76	0.00	0.06
11:10	0.757	38.76	0.00	0.06
11:10	0.841	38.76	0.00	0.06
11:10	0.924	38.76	0.00	0.06
11:11	1.007	38.76	0.00	0.06
11:11	1.413	38.76	0.00	0.06
11:11	1.747	38.76	0.00	0.06
11:12	2.080	38.76	0.00	0.06
11:12	2.413	38.76	0.00	0.06
11:12	2.747	38.76	0.00	0.06
11:13	3.080	38.76	0.00	0.06
11:13	3.413	38.76	0.00	0.06
11:13	3.747	38.76	0.00	0.06
11:14	4.080	38.76	0.00	0.06
11:14	4.413	38.76	0.00	0.06
11:14	4.747	38.76	0.00	0.06
11:15	5.080	38.76	0.00	0.06
11:15	5.413	38.76	0.00	0.06
11:15	5.747	38.76	0.00	0.06
11:16	6.080	38.76	0.00	0.06
11:16	6.413	38.76	0.00	0.06
11:16	6.747	38.76	0.00	0.06
11:17	7.080	38.76	0.00	0.06
11:17	7.413	38.76	0.00	0.06
11:17	7.747	38.76	0.00	0.06

11:18	8.080	38.76	0.00	0.06
11:18	8.413	38.76	0.00	0.06
11:18	8.747	38.76	0.00	0.06
11:19	9.080	38.76	0.00	0.06
11:19	9.413	38.76	0.00	0.06
11:19	9.747	38.76	0.00	0.06
11:20	10.080	38.76	0.00	0.06
11:22	12.115	38.76	0.00	0.06
11:24	14.115	38.76	0.00	0.06
11:26	16.115	38.76	0.00	0.06
11:28	18.115	38.76	0.00	0.06
11:30	20.115	38.76	0.00	0.06
11:32	22.115	38.76	0.00	0.06
11:34	24.115	38.76	0.00	0.06
11:36	26.115	38.76	0.00	0.06
11:38	28.115	38.76	0.00	0.06
11:40	30.115	38.76	0.00	0.06
11:42	32.115	38.76	0.00	0.06
11:44	34.115	38.76	0.00	0.06
11:46	36.115	38.76	0.00	0.06
11:48	38.115	38.76	0.00	0.06
11:50	40.115	38.76	0.00	0.06
11:52	42.115	38.76	0.00	0.06
11:54	44.115	38.76	0.00	0.06
11:56	46.115	38.76	0.00	0.06
11:58	48.115	38.76	0.00	0.06
12:00	50.115	38.76	0.00	0.06
12:02	52.115	38.76	0.00	0.06
12:04	54.115	38.76	0.00	0.06
12:06	56.115	38.76	0.00	0.06
12:08	58.115	38.76	0.00	0.06
12:10	60.115	38.76	0.00	0.06
12:12	62.102	38.76	0.00	0.06
12:14	64.492	38.76	0.00	0.06
12:16	66.188	38.76	0.00	0.06
12:18	68.188	38.76	0.00	0.06
12:20	70.188	38.76	0.00	0.06
12:22	72.188	38.76	0.00	0.06
12:24	74.188	38.76	0.00	0.06
12:26	76.188	38.76	0.00	0.06
12:28	78.188	38.76	0.00	0.06
12:30	80.188	38.76	0.00	0.06
12:32	82.188	38.76	0.00	0.06
12:34	84.188	38.76	0.00	0.06
12:36	86.188	38.76	0.00	0.06
12:38	88.188	38.76	0.00	0.06
12:40	90.188	38.76	0.00	0.06
12:42	92.188	38.76	0.00	0.06
12:44	94.188	38.76	0.00	0.06
12:46	96.188	38.76	0.00	0.06
12:48	98.188	38.76	0.00	0.06
13:10	120.110	38.76	0.00	0.06
13:30	140.110	38.76	0.00	0.06
13:50	160.120	38.76	0.00	0.06
14:10	180.120	38.76	0.00	0.06
14:30	200.120	38.76	0.00	0.06

14:50	220.120	38.75	0.01	0.07
15:10	240.120	38.75	0.01	0.07
15:30	260.120	38.76	0.00	0.06
15:50	280.120	38.76	0.00	0.06
16:10	300.120	38.76	0.00	0.06
16:30	320.050	38.76	0.00	0.06
16:49	340.050	38.76	0.00	0.06
17:10	360.050	38.76	0.00	0.06
17:30	380.050	38.76	0.00	0.06
17:50	400.050	38.76	0.00	0.06
18:10	420.050	38.76	0.00	0.06
18:30	440.050	38.76	0.00	0.06
18:50	460.050	38.76	0.00	0.06
19:10	480.050	38.76	0.00	0.06
19:30	500.050	38.76	0.00	0.06
19:49	520.050	38.75	0.01	0.07
20:10	540.050	38.76	0.00	0.06
20:30	560.050	38.76	0.00	0.06
20:50	580.050	38.76	0.00	0.06
21:10	600.050	38.76	0.00	0.06
21:30	620.050	38.76	0.00	0.06
21:50	640.050	38.75	0.01	0.07
22:10	660.050	38.75	0.01	0.07
22:30	680.050	38.75	0.01	0.07
22:49	700.050	38.75	0.01	0.07
23:10	720.050	38.75	0.01	0.07
23:30	740.050	38.76	0.00	0.06
23:50	760.100	38.76	0.00	0.06
00:10	780.100	38.75	0.01	0.07
00:30	800.100	38.76	0.00	0.06
00:50	820.100	38.76	0.00	0.06
01:10	840.100	38.76	0.00	0.06
01:30	860.100	38.76	0.00	0.06
01:50	880.100	38.76	0.00	0.06
02:10	900.100	38.76	0.00	0.06
02:30	920.100	38.76	0.00	0.06
02:50	940.100	38.76	0.00	0.06
03:10	960.100	38.76	0.00	0.06
03:30	980.100	38.76	0.00	0.06
03:50	1000.100	38.75	0.01	0.07
04:50	1060.300	38.75	0.01	0.07
05:50	1120.300	38.75	0.01	0.07
06:50	1180.300	38.75	0.01	0.07
07:50	1240.300	38.75	0.01	0.07
08:50	1300.300	38.76	0.00	0.06
09:50	1360.300	38.76	0.00	0.06
10:50	1420.300	38.76	0.00	0.06
11:50	1480.300	38.76	0.00	0.06
12:50	1540.300	38.76	0.00	0.06
13:50	1600.300	38.76	0.00	0.06
14:50	1660.300	38.76	0.00	0.06
15:50	1720.100	38.76	0.00	0.06
16:50	1780.100	38.76	0.00	0.06
17:50	1840.100	38.76	0.00	0.06
18:50	1900.100	38.76	0.00	0.06
19:50	1960.100	38.76	0.00	0.06

20:50	2020.100	38.76	0.00	0.06
21:50	2080.100	38.76	0.00	0.06
22:50	2140.100	38.76	0.00	0.06
23:50	2200.100	38.76	0.00	0.06
00:50	2260.100	38.76	0.00	0.06
01:50	2320.100	38.76	0.00	0.06
02:50	2380.100	38.76	0.00	0.06
03:50	2440.100	38.76	0.00	0.06
04:50	2500.100	38.76	0.00	0.06
05:50	2560.100	38.76	0.00	0.06
06:50	2620.100	38.76	0.00	0.06
07:50	2680.100	38.76	0.00	0.06
08:50	2740.200	38.76	0.00	0.06
09:50	2800.200	38.76	0.00	0.06
10:50	2860.200	38.76	0.00	0.06
11:50	2920.100	38.76	0.00	0.06
12:50	2980.200	38.77	-0.01	0.05
13:50	3040.200	38.76	0.00	0.06
14:50	3100.200	38.77	-0.01	0.05
15:50	3160.200	38.77	-0.01	0.05
16:50	3220.200	38.77	-0.01	0.05
17:50	3280.200	38.77	-0.01	0.05
18:50	3340.200	38.77	-0.01	0.05
19:50	3400.200	38.76	0.00	0.06
20:50	3460.200	38.76	0.00	0.06
21:50	3520.200	38.76	0.00	0.06
22:50	3580.200	38.76	0.00	0.06
23:50	3640.200	38.77	-0.01	0.05
00:50	3700.200	38.77	-0.01	0.05
01:50	3760.200	38.77	-0.01	0.05
02:50	3820.200	38.77	-0.01	0.05
03:50	3880.200	38.77	-0.01	0.05
04:50	3940.200	38.77	-0.01	0.05
05:50	4000.200	38.77	-0.01	0.05
06:50	4060.200	38.77	-0.01	0.05
07:50	4120.200	38.77	-0.01	0.05
08:50	4180.200	38.77	-0.01	0.05
09:50	4240.200	-999.99	1038.75	1038.81
10:50	4300.200	-999.99	1038.75	1038.81
11:04	4314.800	-999.99	1038.75	1038.81

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-2 INPUT 9
RADIUS: 25.391 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 5.78 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
09:00	0.000	5.78	0.00
09:00	0.017	-99.99	105.77
09:00	0.034	-99.99	105.77
09:00	0.050	-99.99	105.77
09:00	0.067	-99.99	105.77
09:00	0.084	-99.99	105.77
09:00	0.100	-99.99	105.77
09:00	0.117	-99.99	105.77
09:00	0.134	-99.99	105.77
09:00	0.150	-99.99	105.77
09:00	0.167	-99.99	105.77
09:00	0.257	5.78	0.00
09:00	0.340	5.78	0.00
09:00	0.424	5.78	0.00
09:00	0.507	5.78	0.00
09:00	0.590	5.78	0.00
09:00	0.674	5.78	0.00
09:00	0.757	5.78	0.00
09:00	0.840	5.78	0.00
09:00	0.924	5.78	0.00
09:01	1.007	5.78	0.00
09:01	1.414	5.78	0.00
09:01	1.748	5.78	0.00
09:02	2.081	5.78	0.00
09:02	2.414	5.78	0.00
09:02	2.748	5.78	0.00
09:03	3.081	5.78	0.00
09:03	3.415	5.78	0.00
09:03	3.748	5.78	0.00
09:04	4.081	5.78	0.00
09:04	4.414	5.78	0.00
09:04	4.748	5.78	0.00
09:05	5.081	5.78	0.00
09:05	5.414	5.78	0.00
09:05	5.748	5.78	0.00
09:06	6.081	5.78	0.00
09:06	6.415	5.78	0.00
09:06	6.748	5.78	0.00
09:07	7.081	5.78	0.00
09:07	7.415	5.78	0.00
09:07	7.748	5.78	0.00

09:08	8.081	5.78	0.00
09:08	8.415	5.78	0.00
09:08	8.748	5.78	0.00
09:09	9.081	5.78	0.00
09:09	9.414	5.78	0.00
09:09	9.748	5.78	0.00
09:10	10.081	5.78	0.00
09:12	12.108	5.78	0.00
09:14	14.152	5.78	0.00
09:16	16.152	5.77	0.01
09:18	18.152	5.77	0.01
09:20	20.152	5.77	0.01
09:22	22.152	5.77	0.01
09:24	24.152	5.77	0.01
09:26	26.152	5.77	0.01
09:28	28.215	5.77	0.01
09:30	30.197	5.77	0.01
09:32	32.197	5.77	0.01
09:34	34.197	5.77	0.01
09:36	36.197	5.77	0.01
09:38	38.197	5.77	0.01
09:40	40.197	5.77	0.01
09:42	42.197	5.77	0.01
09:44	44.197	5.77	0.01
09:46	46.197	5.77	0.01
09:48	48.197	5.77	0.01
09:50	50.197	5.77	0.01
09:52	52.197	5.77	0.01
09:54	54.197	5.77	0.01
09:56	56.217	5.77	0.01
09:58	58.100	5.77	0.01
10:00	60.245	5.77	0.01
10:02	62.245	5.77	0.01
10:04	64.245	5.77	0.01
10:06	66.245	5.77	0.01
10:08	68.245	5.77	0.01
10:10	70.245	5.77	0.01
10:12	72.245	5.77	0.01
10:14	74.245	5.77	0.01
10:16	76.245	5.77	0.01
10:18	78.245	5.77	0.01
10:20	80.245	5.77	0.01
10:22	82.245	5.77	0.01
10:24	84.245	5.77	0.01
10:26	86.245	5.77	0.01
10:28	88.245	5.77	0.01
10:30	90.245	5.77	0.01
10:32	92.245	5.77	0.01
10:34	94.245	5.77	0.01
10:36	96.245	5.77	0.01
10:38	98.245	5.77	0.01
11:00	120.210	5.77	0.01
11:20	140.210	5.77	0.01
11:40	160.210	5.77	0.01
12:00	180.220	5.77	0.01
12:20	200.220	5.76	0.02

12:40	220.220	5.76	0.02
13:00	240.220	5.76	0.02
13:20	260.220	5.75	0.03
13:40	280.230	5.73	0.05
14:00	300.230	5.72	0.06
14:20	320.230	5.72	0.06
14:40	340.180	5.71	0.07
15:00	360.100	5.71	0.07
15:20	380.100	5.70	0.08
15:40	400.100	5.69	0.09
16:00	420.170	5.68	0.10
16:20	440.250	5.68	0.10
16:40	460.200	5.67	0.11
17:00	480.170	5.67	0.11
17:20	500.170	5.67	0.11
17:40	520.130	5.67	0.11
18:00	540.120	5.67	0.11
18:20	560.220	5.66	0.12
18:40	580.080	5.67	0.11
19:00	600.220	5.67	0.11
19:20	620.230	5.68	0.10
19:40	640.220	5.68	0.10
20:00	660.220	5.68	0.10
20:20	680.130	5.69	0.09
20:40	700.120	5.69	0.09
21:00	720.230	5.69	0.09
21:20	740.300	5.69	0.09
21:40	760.230	5.69	0.09
22:00	780.230	5.69	0.09
22:20	800.230	5.69	0.09
22:40	820.180	5.70	0.08
23:00	840.570	5.70	0.08
23:20	860.180	5.70	0.08
23:40	880.080	5.70	0.08
00:00	900.170	5.70	0.08
00:20	920.170	5.69	0.09
00:40	940.170	5.69	0.09
01:00	960.170	5.69	0.09
01:20	980.170	5.68	0.10
01:40	1000.200	5.67	0.11
02:40	1060.300	5.66	0.12
03:40	1120.300	5.65	0.13
04:40	1180.300	5.64	0.14
05:40	1240.300	5.64	0.14
06:40	1300.300	5.64	0.14
07:40	1360.200	5.64	0.14
08:40	1420.200	5.64	0.14
09:40	1480.200	5.66	0.12
10:40	1540.200	5.65	0.13
11:40	1600.300	5.65	0.13
12:40	1660.300	5.64	0.14
13:40	1720.200	5.64	0.14
14:40	1780.300	5.61	0.17
15:40	1840.300	5.59	0.19
16:40	1900.300	5.59	0.19
17:40	1960.200	5.57	0.21

18:40	2020.200	5.57	0.21
19:40	2080.200	5.57	0.21
20:40	2140.200	5.57	0.21
21:40	2200.300	5.58	0.20
22:40	2260.300	5.58	0.20
23:40	2320.200	5.57	0.21
00:40	2380.200	5.57	0.21
01:40	2440.200	5.55	0.23
02:40	2500.200	5.55	0.23
03:40	2560.200	5.55	0.23
04:40	2620.200	5.53	0.25
05:40	2680.200	5.54	0.24
06:40	2740.200	5.54	0.24
07:40	2800.200	5.55	0.23
08:40	2860.300	5.56	0.22
09:40	2920.300	5.57	0.21
10:40	2980.300	5.58	0.20
11:40	3040.200	5.59	0.19
12:40	3100.200	5.56	0.22
13:40	3160.300	5.56	0.22
14:40	3220.300	5.53	0.25
15:40	3280.200	5.53	0.25
16:40	3340.200	5.52	0.26
17:40	3400.300	5.52	0.26
18:40	3460.300	5.52	0.26
19:40	3520.300	5.53	0.25
20:40	3580.200	5.53	0.25
21:40	3640.200	5.55	0.23
22:40	3700.200	5.55	0.23
23:40	3760.200	5.55	0.23
00:40	3820.200	5.54	0.24
01:40	3880.200	5.53	0.25
02:40	3940.200	5.53	0.25
03:40	4000.200	5.53	0.25
04:40	4060.200	5.52	0.26
05:40	4120.200	5.51	0.27
06:40	4180.200	5.52	0.26
07:40	4240.300	5.52	0.26
08:40	4300.300	5.53	0.25
09:40	4360.700	5.54	0.24
10:40	4420.300	5.53	0.25
11:40	4480.300	5.52	0.26
12:40	4540.300	5.51	0.27
13:40	4600.300	5.50	0.28
14:40	4660.300	5.48	0.30
15:40	4720.300	5.40	0.38
16:40	4780.300	5.42	0.36
17:40	4840.300	5.41	0.37
18:40	4900.300	5.41	0.37
19:40	4960.300	5.42	0.36
20:40	5020.300	5.43	0.35
21:40	5080.300	5.43	0.35
22:40	5140.300	5.44	0.34
23:40	5200.300	5.44	0.34
00:40	5260.300	5.43	0.35
01:40	5320.300	5.42	0.36

02:40	5380.300	5.41	0.37
03:40	5440.300	5.41	0.37
04:40	5500.300	5.39	0.39
05:40	5560.300	5.39	0.39
06:40	5620.300	5.40	0.38
07:40	5680.300	5.42	0.36
08:40	5740.300	5.42	0.36
09:40	5800.300	5.43	0.35
10:40	5860.300	5.44	0.34
11:40	5920.300	5.46	0.32
12:40	5980.300	5.46	0.32
13:40	6040.300	5.44	0.34
14:40	6100.300	5.41	0.37
15:40	6160.500	5.39	0.39
16:40	6220.300	5.38	0.40
17:40	6280.300	5.38	0.40
18:40	6340.300	5.41	0.37
19:40	6400.400	5.41	0.37
20:40	6460.200	5.41	0.37
21:40	6520.200	5.42	0.36
22:40	6580.300	5.42	0.36
23:40	6640.300	5.42	0.36
00:40	6700.300	5.42	0.36
01:40	6760.300	5.43	0.35
02:40	6820.300	5.41	0.37
03:40	6880.300	5.39	0.39
04:40	6940.300	5.37	0.41
05:40	7000.300	5.37	0.41
06:40	7060.300	5.37	0.41
07:40	7120.300	5.40	0.38
08:40	7180.300	5.45	0.33
09:40	7240.300	5.47	0.31
10:40	7300.300	5.46	0.32
11:40	7360.300	5.44	0.34
12:40	7420.300	5.42	0.36
13:40	7480.300	5.39	0.39
14:40	7540.300	5.34	0.44
15:40	7600.300	5.31	0.47
16:40	7660.300	5.27	0.51
17:40	7720.300	5.24	0.54
18:40	7780.200	5.22	0.56
19:40	7840.200	5.21	0.57
20:40	7900.300	5.18	0.60
21:40	7960.300	5.17	0.61
22:40	8020.300	5.15	0.63
23:40	8080.300	5.13	0.65
00:40	8140.300	5.10	0.68
01:40	8200.300	5.06	0.72
02:40	8260.300	5.04	0.74
03:40	8320.300	5.01	0.77
04:40	8380.300	4.99	0.79
05:40	8440.300	4.97	0.81
06:40	8500.300	4.96	0.82
07:40	8560.200	4.95	0.83
08:40	8620.300	4.97	0.81
09:00	8640.600	4.97	0.81

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-2 INPUT 9
RADIUS: 25.391 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 5.78 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	4.95	0.83
10:35	8735.071	4.94	0.84
10:45	8745.070	4.94	0.84
10:55	8755.072	4.94	0.84
11:05	8765.072	4.95	0.83
11:15	8775.072	4.96	0.82
11:25	8785.072	4.96	0.82
11:35	8795.072	4.94	0.84
11:45	8805.072	4.94	0.84
11:55	8815.102	4.94	0.84
12:05	8825.090	4.94	0.84
12:15	8835.090	4.93	0.85
12:25	8845.090	4.94	0.84
12:35	8855.090	4.93	0.85
12:45	8865.090	4.92	0.86
12:55	8875.120	4.92	0.86
13:04	8884.970	4.93	0.85
13:14	8894.970	4.92	0.86
13:25	8904.970	4.92	0.86
13:34	8914.970	4.90	0.88
13:45	8924.970	4.90	0.88
13:54	8934.970	4.89	0.89
14:05	8944.970	4.90	0.88
14:14	8955.020	4.89	0.89
14:25	8965.080	4.89	0.89
14:35	8975.080	4.88	0.90
14:45	8985.080	4.88	0.90
14:55	8995.080	4.89	0.89
15:05	9005.080	4.88	0.90
15:15	9015.080	4.87	0.91
15:25	9025.080	4.86	0.92
15:35	9035.080	4.86	0.92
15:45	9045.080	4.85	0.93
15:55	9055.080	4.85	0.93
16:04	9065.020	4.85	0.93
16:15	9075.020	4.85	0.93
16:25	9084.970	4.85	0.93
16:35	9095.080	4.84	0.94
16:45	9105.080	4.84	0.94
16:55	9115.080	4.83	0.95

ADJUSTED DATA

17:05	9125.080	4.83	0.95
17:15	9135.080	4.83	0.95
17:25	9145.080	4.83	0.95
17:35	9155.080	4.83	0.95
17:45	9165.080	4.83	0.95
17:55	9175.080	4.82	0.96
18:05	9185.080	4.82	0.96
18:15	9195.080	4.81	0.97
18:25	9205.080	4.80	0.98
18:35	9215.080	4.81	0.97
18:45	9225.080	4.81	0.97
18:55	9235.080	4.80	0.98
19:05	9245.080	4.80	0.98
19:15	9255.080	4.80	0.98
19:25	9265.080	4.80	0.98
19:35	9275.070	4.80	0.98
19:45	9285.080	4.80	0.98
19:55	9295.080	4.80	0.98
20:05	9305.080	4.79	0.99
20:15	9315.080	4.79	0.99
20:25	9325.080	4.79	0.99
20:35	9335.080	4.79	0.99
20:45	9345.080	4.79	0.99
20:55	9355.080	4.80	0.98
21:05	9365.080	4.80	0.98
21:15	9375.080	4.80	0.98
21:25	9385.080	4.80	0.98
21:35	9395.080	4.80	0.98
21:45	9405.080	4.80	0.98
21:55	9415.080	4.80	0.98
22:05	9425.080	4.80	0.98
22:15	9435.080	4.80	0.98
22:25	9445.080	4.80	0.98
22:35	9455.080	4.80	0.98
22:45	9465.080	4.80	0.98
22:54	9475.020	4.80	0.98
23:05	9485.020	4.80	0.98
23:14	9495.020	4.80	0.98
23:25	9505.020	4.80	0.98
23:34	9515.020	4.79	0.99
23:45	9525.020	4.80	0.98
23:55	9535.020	4.79	0.99
00:05	9545.020	4.79	0.99
00:15	9555.020	4.78	1.00
00:25	9565.030	4.79	0.99
00:35	9575.030	4.78	1.00
00:44	9585.030	4.78	1.00
00:55	9595.030	4.78	1.00
01:04	9605.030	4.78	1.00
01:15	9615.030	4.78	1.00
01:25	9625.030	4.78	1.00
01:35	9635.030	4.78	1.00
01:45	9645.030	4.78	1.00
01:55	9655.030	4.78	1.00
02:05	9665.030	4.78	1.00
02:14	9675.030	4.78	1.00

ADJUSTED DATA

02:25	9685.030	4.78	1.00
02:34	9695.030	4.78	1.00
02:45	9705.030	4.78	1.00
02:55	9715.030	4.78	1.00
03:04	9725.000	4.78	1.00
03:15	9735.000	4.78	1.00
03:24	9745.000	4.78	1.00
03:35	9755.100	4.79	0.99
03:44	9765.000	4.78	1.00
03:55	9775.000	4.78	1.00
04:04	9785.000	4.78	1.00
04:15	9795.000	4.78	1.00
04:25	9805.000	4.78	1.00
04:34	9815.000	4.78	1.00
04:45	9825.000	4.78	1.00
04:54	9835.000	4.78	1.00
05:05	9845.000	4.78	1.00
05:14	9855.000	4.78	1.00
05:25	9865.000	4.78	1.00
05:34	9875.000	4.78	1.00
05:45	9885.000	4.78	1.00
05:55	9895.000	4.78	1.00
06:04	9905.000	4.78	1.00
06:15	9915.000	4.78	1.00
06:24	9925.000	4.78	1.00
06:35	9935.000	4.78	1.00
06:44	9945.000	4.78	1.00
06:55	9955.000	4.79	0.99
07:05	9965.100	4.79	0.99
07:15	9975.100	4.79	0.99
07:25	9985.100	4.80	0.98
07:35	9995.100	4.80	0.98
07:45	10005.100	4.80	0.98
07:55	10015.100	4.80	0.98
08:05	10025.100	4.81	0.97
08:15	10035.100	4.81	0.97
08:25	10045.100	4.81	0.97
08:35	10055.100	4.82	0.96
08:45	10065.100	4.83	0.95
08:55	10075.000	4.82	0.96
09:04	10085.000	4.83	0.95
09:15	10095.000	4.83	0.95
09:24	10105.000	4.83	0.95
09:28	10108.200	4.83	0.95

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-2 INPUT 9
RADIUS: 25.391 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 5.78 FEET
WATER STOP LEVEL: 5.01 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1005.00	1005.77
11:10	0.034	-999.99	1005.00	1005.77
11:10	0.050	-999.99	1005.00	1005.77
11:10	0.067	-999.99	1005.00	1005.77
11:10	0.084	-999.99	1005.00	1005.77
11:10	0.100	-999.99	1005.00	1005.77
11:10	0.117	-999.99	1005.00	1005.77
11:10	0.134	-999.99	1005.00	1005.77
11:10	0.150	-999.99	1005.00	1005.77
11:10	0.167	-999.99	1005.00	1005.77
11:10	0.257	5.01	0.00	0.77
11:10	0.341	5.01	0.00	0.77
11:10	0.424	5.01	0.00	0.77
11:10	0.507	5.01	0.00	0.77
11:10	0.591	5.01	0.00	0.77
11:10	0.674	5.01	0.00	0.77
11:10	0.757	5.01	0.00	0.77
11:10	0.841	5.01	0.00	0.77
11:10	0.924	5.01	0.00	0.77
11:11	1.007	5.01	0.00	0.77
11:11	1.413	5.01	0.00	0.77
11:11	1.747	5.01	0.00	0.77
11:12	2.080	5.01	0.00	0.77
11:12	2.413	5.02	-0.01	0.76
11:12	2.747	5.02	-0.01	0.76
11:13	3.080	5.03	-0.02	0.75
11:13	3.413	5.03	-0.02	0.75
11:13	3.747	5.03	-0.02	0.75
11:14	4.080	5.03	-0.02	0.75
11:14	4.413	5.03	-0.02	0.75
11:14	4.747	5.02	-0.01	0.76
11:15	5.080	5.02	-0.01	0.76
11:15	5.413	5.01	0.00	0.77
11:15	5.747	5.01	0.00	0.77
11:16	6.080	5.01	0.00	0.77
11:16	6.413	5.02	-0.01	0.76
11:16	6.747	5.02	-0.01	0.76
11:17	7.080	5.02	-0.01	0.76

11:17	7.413	5.02	-0.01	0.76
11:17	7.747	5.02	-0.01	0.76
11:18	8.080	5.02	-0.01	0.76
11:18	8.413	5.02	-0.01	0.76
11:18	8.747	5.02	-0.01	0.76
11:19	9.080	5.02	-0.01	0.76
11:19	9.413	5.02	-0.01	0.76
11:19	9.747	5.02	-0.01	0.76
11:20	10.080	5.02	-0.01	0.76
11:22	12.115	5.02	-0.01	0.76
11:24	14.115	5.03	-0.02	0.75
11:26	16.115	5.04	-0.03	0.74
11:28	18.115	5.03	-0.02	0.75
11:30	20.115	5.04	-0.03	0.74
11:32	22.115	5.04	-0.03	0.74
11:34	24.115	5.03	-0.02	0.75
11:36	26.115	5.03	-0.02	0.75
11:38	28.115	5.03	-0.02	0.75
11:40	30.115	5.02	-0.01	0.76
11:42	32.115	5.02	-0.01	0.76
11:44	34.115	5.02	-0.01	0.76
11:46	36.115	5.04	-0.03	0.74
11:48	38.115	5.04	-0.03	0.74
11:50	40.115	5.04	-0.03	0.74
11:52	42.115	5.05	-0.04	0.73
11:54	44.115	5.04	-0.03	0.74
11:56	46.115	5.04	-0.03	0.74
11:58	48.115	5.03	-0.02	0.75
12:00	50.115	5.03	-0.02	0.75
12:02	52.115	5.03	-0.02	0.75
12:04	54.115	5.03	-0.02	0.75
12:06	56.115	5.04	-0.03	0.74
12:08	58.115	5.04	-0.03	0.74
12:10	60.115	5.05	-0.04	0.73
12:12	62.102	5.04	-0.03	0.74
12:14	64.492	5.04	-0.03	0.74
12:16	66.188	5.03	-0.02	0.75
12:18	68.188	5.04	-0.03	0.74
12:20	70.188	5.04	-0.03	0.74
12:22	72.188	5.04	-0.03	0.74
12:24	74.188	5.04	-0.03	0.74
12:26	76.188	5.03	-0.02	0.75
12:28	78.188	5.03	-0.02	0.75
12:30	80.188	5.03	-0.02	0.75
12:32	82.188	5.03	-0.02	0.75
12:34	84.188	5.02	-0.01	0.76
12:36	86.188	5.02	-0.01	0.76
12:38	88.188	5.04	-0.03	0.74
12:40	90.188	5.03	-0.02	0.75
12:42	92.188	5.03	-0.02	0.75
12:44	94.188	5.02	-0.01	0.76
12:46	96.188	5.02	-0.01	0.76
12:48	98.188	5.01	0.00	0.77
13:10	120.110	5.03	-0.02	0.75
13:30	140.110	5.02	-0.01	0.76
13:50	160.120	5.02	-0.01	0.76

14:10	180.120	5.00	0.01	0.78
14:30	200.120	4.99	0.02	0.79
14:50	220.120	4.99	0.02	0.79
15:10	240.120	4.98	0.03	0.80
15:30	260.120	4.99	0.02	0.79
15:50	280.120	4.98	0.03	0.80
16:10	300.120	4.97	0.04	0.81
16:30	320.050	4.97	0.04	0.81
16:49	340.050	4.97	0.04	0.81
17:10	360.050	4.97	0.04	0.81
17:30	380.050	4.97	0.04	0.81
17:50	400.050	4.98	0.03	0.80
18:10	420.050	4.98	0.03	0.80
18:30	440.050	4.98	0.03	0.80
18:50	460.050	4.99	0.02	0.79
19:10	480.050	4.99	0.02	0.79
19:30	500.050	5.00	0.01	0.78
19:49	520.050	5.01	0.00	0.77
20:10	540.050	5.02	-0.01	0.76
20:30	560.050	5.03	-0.02	0.75
20:50	580.050	5.04	-0.03	0.74
21:10	600.050	5.04	-0.03	0.74
21:30	620.050	5.05	-0.04	0.73
21:50	640.050	5.06	-0.05	0.72
22:10	660.050	5.06	-0.05	0.72
22:30	680.050	5.07	-0.06	0.71
22:49	700.050	5.08	-0.07	0.70
23:10	720.050	5.08	-0.07	0.70
23:30	740.050	5.08	-0.07	0.70
23:50	760.100	5.09	-0.08	0.69
00:10	780.100	5.09	-0.08	0.69
00:30	800.100	5.10	-0.09	0.68
00:50	820.100	5.10	-0.09	0.68
01:10	840.100	5.10	-0.09	0.68
01:30	860.100	5.10	-0.09	0.68
01:50	880.100	5.10	-0.09	0.68
02:10	900.100	5.11	-0.10	0.67
02:30	920.100	5.11	-0.10	0.67
02:50	940.100	5.12	-0.11	0.66
03:10	960.100	5.12	-0.11	0.66
03:30	980.100	5.13	-0.12	0.65
03:50	1000.100	5.13	-0.12	0.65
04:50	1060.300	5.13	-0.12	0.65
05:50	1120.300	5.15	-0.14	0.63
06:50	1180.300	5.16	-0.15	0.62
07:50	1240.300	5.18	-0.17	0.60
08:50	1300.300	5.21	-0.20	0.57
09:50	1360.300	5.23	-0.22	0.55
10:50	1420.300	5.24	-0.23	0.54
11:50	1480.300	5.24	-0.23	0.54
12:50	1540.300	5.23	-0.22	0.55
13:50	1600.300	5.21	-0.20	0.57
14:50	1660.300	5.18	-0.17	0.60
15:50	1720.100	5.16	-0.15	0.62
16:50	1780.100	5.16	-0.15	0.62
17:50	1840.100	5.16	-0.15	0.62

18:50	1900.100	5.16	-0.15	0.62
19:50	1960.100	5.18	-0.17	0.60
20:50	2020.100	5.20	-0.19	0.58
21:50	2080.100	5.21	-0.20	0.57
22:50	2140.100	5.23	-0.22	0.55
23:50	2200.100	5.24	-0.23	0.54
00:50	2260.100	5.24	-0.23	0.54
01:50	2320.100	5.24	-0.23	0.54
02:50	2380.100	5.24	-0.23	0.54
03:50	2440.100	5.24	-0.23	0.54
04:50	2500.100	5.24	-0.23	0.54
05:50	2560.100	5.24	-0.23	0.54
06:50	2620.100	5.25	-0.24	0.53
07:50	2680.100	5.26	-0.25	0.52
08:50	2740.200	5.27	-0.26	0.51
09:50	2800.200	5.28	-0.27	0.50
10:50	2860.200	5.29	-0.28	0.49
11:50	2920.100	5.28	-0.27	0.50
12:50	2980.200	5.26	-0.25	0.52
13:50	3040.200	5.21	-0.20	0.57
14:50	3100.200	5.21	-0.20	0.57
15:50	3160.200	5.17	-0.16	0.61
16:50	3220.200	5.15	-0.14	0.63
17:50	3280.200	5.15	-0.14	0.63
18:50	3340.200	5.15	-0.14	0.63
19:50	3400.200	5.17	-0.16	0.61
20:50	3460.200	5.18	-0.17	0.60
21:50	3520.200	5.19	-0.18	0.59
22:50	3580.200	5.19	-0.18	0.59
23:50	3640.200	5.20	-0.19	0.58
00:50	3700.200	5.19	-0.18	0.59
01:50	3760.200	5.19	-0.18	0.59
02:50	3820.200	5.19	-0.18	0.59
03:50	3880.200	5.19	-0.18	0.59
04:50	3940.200	5.19	-0.18	0.59
05:50	4000.200	5.19	-0.18	0.59
06:50	4060.200	5.21	-0.20	0.57
07:50	4120.200	5.21	-0.20	0.57
08:50	4180.200	5.26	-0.25	0.52
09:50	4240.200	-999.99	1005.00	1005.77
10:50	4300.200	-999.99	1005.00	1005.77
11:04	4314.800	-999.99	1005.00	1005.77

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 7.14 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
09:00	0.000	7.14	0.00
09:00	0.017	-99.99	107.13
09:00	0.034	-99.99	107.13
09:00	0.050	-99.99	107.13
09:00	0.067	-99.99	107.13
09:00	0.084	-99.99	107.13
09:00	0.100	-99.99	107.13
09:00	0.117	-99.99	107.13
09:00	0.134	-99.99	107.13
09:00	0.150	-99.99	107.13
09:00	0.167	-99.99	107.13
09:00	0.257	7.14	0.00
09:00	0.340	7.14	0.00
09:00	0.424	7.14	0.00
09:00	0.507	7.14	0.00
09:00	0.590	7.14	0.00
09:00	0.674	7.14	0.00
09:00	0.757	7.14	0.00
09:00	0.840	7.14	0.00
09:00	0.924	7.14	0.00
09:01	1.007	7.14	0.00
09:01	1.414	7.14	0.00
09:01	1.748	7.14	0.00
09:02	2.081	7.14	0.00
09:02	2.414	7.14	0.00
09:02	2.748	7.14	0.00
09:03	3.081	7.14	0.00
09:03	3.415	7.14	0.00
09:03	3.748	7.14	0.00
09:04	4.081	7.14	0.00
09:04	4.414	7.14	0.00
09:04	4.748	7.14	0.00
09:05	5.081	7.13	0.01
09:05	5.414	7.13	0.01
09:05	5.748	7.13	0.01
09:06	6.081	7.13	0.01
09:06	6.415	7.13	0.01
09:06	6.748	7.13	0.01
09:07	7.081	7.13	0.01
09:07	7.415	7.13	0.01
09:07	7.748	7.13	0.01

09:08	8.081	7.13	0.01
09:08	8.415	7.13	0.01
09:08	8.748	7.13	0.01
09:09	9.081	7.13	0.01
09:09	9.414	7.13	0.01
09:09	9.748	7.13	0.01
09:10	10.081	7.13	0.01
09:12	12.108	7.13	0.01
09:14	14.152	7.13	0.01
09:16	16.152	7.13	0.01
09:18	18.152	7.13	0.01
09:20	20.152	7.13	0.01
09:22	22.152	7.13	0.01
09:24	24.152	7.13	0.01
09:26	26.152	7.13	0.01
09:28	28.215	7.13	0.01
09:30	30.197	7.13	0.01
09:32	32.197	7.13	0.01
09:34	34.197	7.13	0.01
09:36	36.197	7.13	0.01
09:38	38.197	7.13	0.01
09:40	40.197	7.13	0.01
09:42	42.197	7.13	0.01
09:44	44.197	7.13	0.01
09:46	46.197	7.13	0.01
09:48	48.197	7.13	0.01
09:50	50.197	7.13	0.01
09:52	52.197	7.13	0.01
09:54	54.197	7.14	0.00
09:56	56.217	7.13	0.01
09:58	58.100	7.13	0.01
10:00	60.245	7.13	0.01
10:02	62.245	7.14	0.00
10:04	64.245	7.13	0.01
10:06	66.245	7.14	0.00
10:08	68.245	7.13	0.01
10:10	70.245	7.13	0.01
10:12	72.245	7.14	0.00
10:14	74.245	7.13	0.01
10:16	76.245	7.13	0.01
10:18	78.245	7.14	0.00
10:20	80.245	7.13	0.01
10:22	82.245	7.13	0.01
10:24	84.245	7.14	0.00
10:26	86.245	7.14	0.00
10:28	88.245	7.14	0.00
10:30	90.245	7.13	0.01
10:32	92.245	7.13	0.01
10:34	94.245	7.13	0.01
10:36	96.245	7.13	0.01
10:38	98.245	7.13	0.01
11:00	120.210	7.14	0.00
11:20	140.210	7.14	0.00
11:40	160.210	7.13	0.01
12:00	180.220	7.13	0.01
12:20	200.220	7.13	0.01

12:40	220.220	7.12	0.02
13:00	240.220	7.11	0.03
13:20	260.220	7.11	0.03
13:40	280.230	7.09	0.05
14:00	300.230	7.08	0.06
14:20	320.230	7.07	0.07
14:40	340.180	7.07	0.07
15:00	360.100	7.07	0.07
15:20	380.100	7.06	0.08
15:40	400.100	7.06	0.08
16:00	420.170	7.05	0.09
16:20	440.250	7.05	0.09
16:40	460.200	7.04	0.10
17:00	480.170	7.04	0.10
17:20	500.170	7.04	0.10
17:40	520.130	7.04	0.10
18:00	540.120	7.04	0.10
18:20	560.220	7.04	0.10
18:40	580.080	7.04	0.10
19:00	600.220	7.05	0.09
19:20	620.230	7.05	0.09
19:40	640.220	7.06	0.08
20:00	660.220	7.06	0.08
20:20	680.130	7.06	0.08
20:40	700.120	7.06	0.08
21:00	720.230	7.06	0.08
21:20	740.300	7.06	0.08
21:40	760.230	7.06	0.08
22:00	780.230	7.07	0.07
22:20	800.230	7.07	0.07
22:40	820.180	7.08	0.06
23:00	840.570	7.08	0.06
23:20	860.180	7.07	0.07
23:40	880.080	7.07	0.07
00:00	900.170	7.07	0.07
00:20	920.170	7.07	0.07
00:40	940.170	7.06	0.08
01:00	960.170	7.05	0.09
01:20	980.170	7.04	0.10
01:40	1000.200	7.04	0.10
02:40	1060.300	7.04	0.10
03:40	1120.300	7.02	0.12
04:40	1180.300	7.02	0.12
05:40	1240.300	7.02	0.12
06:40	1300.300	7.02	0.12
07:40	1360.200	7.02	0.12
08:40	1420.200	7.03	0.11
09:40	1480.200	7.05	0.09
10:40	1540.200	7.05	0.09
11:40	1600.300	7.04	0.10
12:40	1660.300	7.04	0.10
13:40	1720.200	7.02	0.12
14:40	1780.300	7.00	0.14
15:40	1840.300	6.98	0.16
16:40	1900.300	6.97	0.17
17:40	1960.200	6.97	0.17

18:40	2020.200	6.97	0.17
19:40	2080.200	6.97	0.17
20:40	2140.200	6.98	0.16
21:40	2200.300	6.99	0.15
22:40	2260.300	6.99	0.15
23:40	2320.200	6.98	0.16
00:40	2380.200	6.97	0.17
01:40	2440.200	6.95	0.19
02:40	2500.200	6.95	0.19
03:40	2560.200	6.94	0.20
04:40	2620.200	6.93	0.21
05:40	2680.200	6.94	0.20
06:40	2740.200	6.95	0.19
07:40	2800.200	6.96	0.18
08:40	2860.300	6.98	0.16
09:40	2920.300	7.00	0.14
10:40	2980.300	7.00	0.14
11:40	3040.200	7.00	0.14
12:40	3100.200	6.99	0.15
13:40	3160.300	6.98	0.16
14:40	3220.300	6.95	0.19
15:40	3280.200	6.95	0.19
16:40	3340.200	6.94	0.20
17:40	3400.300	6.95	0.19
18:40	3460.300	6.95	0.19
19:40	3520.300	6.96	0.18
20:40	3580.200	6.97	0.17
21:40	3640.200	6.98	0.16
22:40	3700.200	6.98	0.16
23:40	3760.200	6.98	0.16
00:40	3820.200	6.97	0.17
01:40	3880.200	6.97	0.17
02:40	3940.200	6.96	0.18
03:40	4000.200	6.95	0.19
04:40	4060.200	6.95	0.19
05:40	4120.200	6.95	0.19
06:40	4180.200	6.95	0.19
07:40	4240.300	6.96	0.18
08:40	4300.300	6.96	0.18
09:40	4360.700	6.98	0.16
10:40	4420.300	6.97	0.17
11:40	4480.300	6.97	0.17
12:40	4540.300	6.95	0.19
13:40	4600.300	6.92	0.22
14:40	4660.300	6.90	0.24
15:40	4720.300	6.87	0.27
16:40	4780.300	6.87	0.27
17:40	4840.300	6.86	0.28
18:40	4900.300	6.87	0.27
19:40	4960.300	6.87	0.27
20:40	5020.300	6.89	0.25
21:40	5080.300	6.89	0.25
22:40	5140.300	6.90	0.24
23:40	5200.300	6.90	0.24
00:40	5260.300	6.88	0.26
01:40	5320.300	6.87	0.27

02:40	5380.300	6.86	0.28
03:40	5440.300	6.85	0.29
04:40	5500.300	6.84	0.30
05:40	5560.300	6.84	0.30
06:40	5620.300	6.87	0.27
07:40	5680.300	6.88	0.26
08:40	5740.300	6.87	0.27
09:40	5800.300	6.89	0.25
10:40	5860.300	6.90	0.24
11:40	5920.300	6.93	0.21
12:40	5980.300	6.90	0.24
13:40	6040.300	6.90	0.24
14:40	6100.300	6.84	0.30
15:40	6160.500	6.82	0.32
16:40	6220.300	6.84	0.30
17:40	6280.300	6.84	0.30
18:40	6340.300	6.88	0.26
19:40	6400.400	6.88	0.26
20:40	6460.200	6.89	0.25
21:40	6520.200	6.89	0.25
22:40	6580.300	6.89	0.25
23:40	6640.300	6.89	0.25
00:40	6700.300	6.89	0.25
01:40	6760.300	6.89	0.25
02:40	6820.300	6.88	0.26
03:40	6880.300	6.86	0.28
04:40	6940.300	6.84	0.30
05:40	7000.300	6.83	0.31
06:40	7060.300	6.86	0.28
07:40	7120.300	6.90	0.24
08:40	7180.300	6.95	0.19
09:40	7240.300	6.96	0.18
10:40	7300.300	6.93	0.21
11:40	7360.300	6.92	0.22
12:40	7420.300	6.89	0.25
13:40	7480.300	6.86	0.28
14:40	7540.300	6.80	0.34
15:40	7600.300	6.76	0.38
16:40	7660.300	6.72	0.42
17:40	7720.300	6.69	0.45
18:40	7780.200	6.66	0.48
19:40	7840.200	6.67	0.47
20:40	7900.300	6.64	0.50
21:40	7960.300	6.63	0.51
22:40	8020.300	6.62	0.52
23:40	8080.300	6.60	0.54
00:40	8140.300	6.56	0.58
01:40	8200.300	6.53	0.61
02:40	8260.300	6.52	0.62
03:40	8320.300	6.49	0.65
04:40	8380.300	6.47	0.67
05:40	8440.300	6.46	0.68
06:40	8500.300	6.46	0.68
07:40	8560.200	6.45	0.69
08:40	8620.300	6.47	0.67
09:00	8640.600	6.48	0.66

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 7.14 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	6.45	0.69
10:35	8735.071	6.44	0.70
10:45	8745.070	6.44	0.70
10:55	8755.072	6.43	0.71
11:05	8765.072	6.43	0.71
11:15	8775.072	6.45	0.69
11:25	8785.072	6.45	0.69
11:35	8795.072	6.44	0.70
11:45	8805.072	6.42	0.72
11:55	8815.102	6.42	0.72
12:05	8825.090	6.42	0.72
12:15	8835.090	6.42	0.72
12:25	8845.090	6.41	0.73
12:35	8855.090	6.42	0.72
12:45	8865.090	6.40	0.74
12:55	8875.120	6.40	0.74
13:04	8884.970	6.40	0.74
13:14	8894.970	6.40	0.74
13:25	8904.970	6.40	0.74
13:34	8914.970	6.40	0.74
13:45	8924.970	6.39	0.75
13:54	8934.970	6.37	0.77
14:05	8944.970	6.38	0.76
14:14	8955.020	6.37	0.77
14:25	8965.080	6.37	0.77
14:35	8975.080	6.36	0.78
14:45	8985.080	6.36	0.78
14:55	8995.080	6.36	0.78
15:05	9005.080	6.36	0.78
15:15	9015.080	6.35	0.79
15:25	9025.080	6.35	0.79
15:35	9035.080	6.34	0.80
15:45	9045.080	6.34	0.80
15:55	9055.080	6.33	0.81
16:04	9065.020	6.33	0.81
16:15	9075.020	6.33	0.81
16:25	9084.970	6.33	0.81
16:35	9095.080	6.33	0.81
16:45	9105.080	6.32	0.82
16:55	9115.080	6.32	0.82

ADJUSTED DATA

17:05	9125.080	6.31	0.83
17:15	9135.080	6.31	0.83
17:25	9145.080	6.31	0.83
17:35	9155.080	6.31	0.83
17:45	9165.080	6.31	0.83
17:55	9175.080	6.31	0.83
18:05	9185.080	6.31	0.83
18:15	9195.080	6.30	0.84
18:25	9205.080	6.30	0.84
18:35	9215.080	6.30	0.84
18:45	9225.080	6.30	0.84
18:55	9235.080	6.29	0.85
19:05	9245.080	6.29	0.85
19:15	9255.080	6.29	0.85
19:25	9265.080	6.29	0.85
19:35	9275.070	6.29	0.85
19:45	9285.080	6.29	0.85
19:55	9295.080	6.29	0.85
20:05	9305.080	6.29	0.85
20:15	9315.080	6.29	0.85
20:25	9325.080	6.29	0.85
20:35	9335.080	6.29	0.85
20:45	9345.080	6.29	0.85
20:55	9355.080	6.29	0.85
21:05	9365.080	6.29	0.85
21:15	9375.080	6.30	0.84
21:25	9385.080	6.30	0.84
21:35	9395.080	6.30	0.84
21:45	9405.080	6.30	0.84
21:55	9415.080	6.30	0.84
22:05	9425.080	6.30	0.84
22:15	9435.080	6.30	0.84
22:25	9445.080	6.30	0.84
22:35	9455.080	6.30	0.84
22:45	9465.080	6.30	0.84
22:54	9475.020	6.29	0.85
23:05	9485.020	6.29	0.85
23:14	9495.020	6.29	0.85
23:25	9505.020	6.29	0.85
23:34	9515.020	6.28	0.86
23:45	9525.020	6.29	0.85
23:55	9535.020	6.28	0.86
00:05	9545.020	6.28	0.86
00:15	9555.020	6.28	0.86
00:25	9565.030	6.28	0.86
00:35	9575.030	6.27	0.87
00:44	9585.030	6.27	0.87
00:55	9595.030	6.27	0.87
01:04	9605.030	6.27	0.87
01:15	9615.030	6.27	0.87
01:25	9625.030	6.27	0.87
01:35	9635.030	6.27	0.87
01:45	9645.030	6.27	0.87
01:55	9655.030	6.27	0.87
02:05	9665.030	6.27	0.87
02:14	9675.030	6.27	0.87

ADJUSTED DATA

02:25	9685.030	6.27	0.87
02:34	9695.030	6.27	0.87
02:45	9705.030	6.28	0.86
02:55	9715.030	6.28	0.86
03:04	9725.000	6.28	0.86
03:15	9735.000	6.28	0.86
03:24	9745.000	6.28	0.86
03:35	9755.100	6.27	0.87
03:44	9765.000	6.27	0.87
03:55	9775.000	6.27	0.87
04:04	9785.000	6.27	0.87
04:15	9795.000	6.27	0.87
04:25	9805.000	6.27	0.87
04:34	9815.000	6.27	0.87
04:45	9825.000	6.27	0.87
04:54	9835.000	6.27	0.87
05:05	9845.000	6.27	0.87
05:14	9855.000	6.27	0.87
05:25	9865.000	6.27	0.87
05:34	9875.000	6.27	0.87
05:45	9885.000	6.28	0.86
05:55	9895.000	6.28	0.86
06:04	9905.000	6.27	0.87
06:15	9915.000	6.28	0.86
06:24	9925.000	6.28	0.86
06:35	9935.000	6.28	0.86
06:44	9945.000	6.28	0.86
06:55	9955.000	6.28	0.86
07:05	9965.100	6.28	0.86
07:15	9975.100	6.29	0.85
07:25	9985.100	6.29	0.85
07:35	9995.100	6.29	0.85
07:45	10005.100	6.29	0.85
07:55	10015.100	6.29	0.85
08:05	10025.100	6.30	0.84
08:15	10035.100	6.31	0.83
08:25	10045.100	6.31	0.83
08:35	10055.100	6.32	0.82
08:45	10065.100	6.32	0.82
08:55	10075.000	6.32	0.82
09:04	10085.000	6.33	0.81
09:15	10095.000	6.33	0.81
09:24	10105.000	6.33	0.81
09:28	10108.200	6.33	0.81

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-3 INPUT 10
RADIUS: 63.843 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 7.14 FEET
WATER STOP LEVEL: 6.39 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1006.38	1007.13
11:10	0.034	-999.99	1006.38	1007.13
11:10	0.050	-999.99	1006.38	1007.13
11:10	0.067	-999.99	1006.38	1007.13
11:10	0.084	-999.99	1006.38	1007.13
11:10	0.100	-999.99	1006.38	1007.13
11:10	0.117	-999.99	1006.38	1007.13
11:10	0.134	-999.99	1006.38	1007.13
11:10	0.150	-999.99	1006.38	1007.13
11:10	0.167	-999.99	1006.38	1007.13
11:10	0.257	6.39	0.00	0.75
11:10	0.341	6.39	0.00	0.75
11:10	0.424	6.39	0.00	0.75
11:10	0.507	6.39	0.00	0.75
11:10	0.591	6.39	0.00	0.75
11:10	0.674	6.39	0.00	0.75
11:10	0.757	6.39	0.00	0.75
11:10	0.841	6.39	0.00	0.75
11:10	0.924	6.39	0.00	0.75
11:11	1.007	6.39	0.00	0.75
11:11	1.413	6.39	0.00	0.75
11:11	1.747	6.39	0.00	0.75
11:12	2.080	6.39	0.00	0.75
11:12	2.413	6.39	0.00	0.75
11:12	2.747	6.39	0.00	0.75
11:13	3.080	6.39	0.00	0.75
11:13	3.413	6.39	0.00	0.75
11:13	3.747	6.39	0.00	0.75
11:14	4.080	6.39	0.00	0.75
11:14	4.413	6.39	0.00	0.75
11:14	4.747	6.39	0.00	0.75
11:15	5.080	6.39	0.00	0.75
11:15	5.413	6.39	0.00	0.75
11:15	5.747	6.39	0.00	0.75
11:16	6.080	6.39	0.00	0.75
11:16	6.413	6.39	0.00	0.75
11:16	6.747	6.39	0.00	0.75
11:17	7.080	6.39	0.00	0.75

11:17	7.413	6.39	0.00	0.75
11:17	7.747	6.39	0.00	0.75
11:18	8.080	6.39	0.00	0.75
11:18	8.413	6.38	0.01	0.76
11:18	8.747	6.39	0.00	0.75
11:19	9.080	6.39	0.00	0.75
11:19	9.413	6.39	0.00	0.75
11:19	9.747	6.39	0.00	0.75
11:20	10.080	6.39	0.00	0.75
11:22	12.115	6.40	-0.01	0.74
11:24	14.115	6.40	-0.01	0.74
11:26	16.115	6.40	-0.01	0.74
11:28	18.115	6.40	-0.01	0.74
11:30	20.115	6.40	-0.01	0.74
11:32	22.115	6.40	-0.01	0.74
11:34	24.115	6.40	-0.01	0.74
11:36	26.115	6.40	-0.01	0.74
11:38	28.115	6.40	-0.01	0.74
11:40	30.115	6.40	-0.01	0.74
11:42	32.115	6.40	-0.01	0.74
11:44	34.115	6.40	-0.01	0.74
11:46	36.115	6.40	-0.01	0.74
11:48	38.115	6.40	-0.01	0.74
11:50	40.115	6.40	-0.01	0.74
11:52	42.115	6.41	-0.02	0.73
11:54	44.115	6.40	-0.01	0.74
11:56	46.115	6.40	-0.01	0.74
11:58	48.115	6.40	-0.01	0.74
12:00	50.115	6.40	-0.01	0.74
12:02	52.115	6.40	-0.01	0.74
12:04	54.115	6.40	-0.01	0.74
12:06	56.115	6.40	-0.01	0.74
12:08	58.115	6.40	-0.01	0.74
12:10	60.115	6.40	-0.01	0.74
12:12	62.102	6.40	-0.01	0.74
12:14	64.492	6.40	-0.01	0.74
12:16	66.188	6.39	0.00	0.75
12:18	68.188	6.39	0.00	0.75
12:20	70.188	6.39	0.00	0.75
12:22	72.188	6.39	0.00	0.75
12:24	74.188	6.39	0.00	0.75
12:26	76.188	6.39	0.00	0.75
12:28	78.188	6.39	0.00	0.75
12:30	80.188	6.39	0.00	0.75
12:32	82.188	6.39	0.00	0.75
12:34	84.188	6.39	0.00	0.75
12:36	86.188	6.39	0.00	0.75
12:38	88.188	6.39	0.00	0.75
12:40	90.188	6.39	0.00	0.75
12:42	92.188	6.39	0.00	0.75
12:44	94.188	6.39	0.00	0.75
12:46	96.188	6.39	0.00	0.75
12:48	98.188	6.39	0.00	0.75
13:10	120.110	6.38	0.01	0.76
13:30	140.110	6.38	0.01	0.76
13:50	160.120	6.37	0.02	0.77

14:10	180.120	6.36	0.03	0.78
14:30	200.120	6.35	0.04	0.79
14:50	220.120	6.35	0.04	0.79
15:10	240.120	6.34	0.05	0.80
15:30	260.120	6.34	0.05	0.80
15:50	280.120	6.34	0.05	0.80
16:10	300.120	6.34	0.05	0.80
16:30	320.050	6.34	0.05	0.80
16:49	340.050	6.34	0.05	0.80
17:10	360.050	6.34	0.05	0.80
17:30	380.050	6.35	0.04	0.79
17:50	400.050	6.35	0.04	0.79
18:10	420.050	6.35	0.04	0.79
18:30	440.050	6.36	0.03	0.78
18:50	460.050	6.37	0.02	0.77
19:10	480.050	6.37	0.02	0.77
19:30	500.050	6.38	0.01	0.76
19:49	520.050	6.39	0.00	0.75
20:10	540.050	6.39	0.00	0.75
20:30	560.050	6.41	-0.02	0.73
20:50	580.050	6.42	-0.03	0.72
21:10	600.050	6.42	-0.03	0.72
21:30	620.050	6.43	-0.04	0.71
21:50	640.050	6.43	-0.04	0.71
22:10	660.050	6.44	-0.05	0.70
22:30	680.050	6.45	-0.06	0.69
22:49	700.050	6.45	-0.06	0.69
23:10	720.050	6.46	-0.07	0.68
23:30	740.050	6.46	-0.07	0.68
23:50	760.100	6.46	-0.07	0.68
00:10	780.100	6.47	-0.08	0.67
00:30	800.100	6.47	-0.08	0.67
00:50	820.100	6.47	-0.08	0.67
01:10	840.100	6.47	-0.08	0.67
01:30	860.100	6.47	-0.08	0.67
01:50	880.100	6.48	-0.09	0.66
02:10	900.100	6.48	-0.09	0.66
02:30	920.100	6.49	-0.10	0.65
02:50	940.100	6.49	-0.10	0.65
03:10	960.100	6.50	-0.11	0.64
03:30	980.100	6.49	-0.10	0.65
03:50	1000.100	6.50	-0.11	0.64
04:50	1060.300	6.50	-0.11	0.64
05:50	1120.300	6.52	-0.13	0.62
06:50	1180.300	6.54	-0.15	0.60
07:50	1240.300	6.55	-0.16	0.59
08:50	1300.300	6.58	-0.19	0.56
09:50	1360.300	6.60	-0.21	0.54
10:50	1420.300	6.61	-0.22	0.53
11:50	1480.300	6.61	-0.22	0.53
12:50	1540.300	6.59	-0.20	0.55
13:50	1600.300	6.57	-0.18	0.57
14:50	1660.300	6.54	-0.15	0.60
15:50	1720.100	6.53	-0.14	0.61
16:50	1780.100	6.53	-0.14	0.61
17:50	1840.100	6.53	-0.14	0.61

18:50	1900.100	6.54	-0.15	0.60
19:50	1960.100	6.56	-0.17	0.58
20:50	2020.100	6.58	-0.19	0.56
21:50	2080.100	6.59	-0.20	0.55
22:50	2140.100	6.60	-0.21	0.54
23:50	2200.100	6.62	-0.23	0.52
00:50	2260.100	6.61	-0.22	0.53
01:50	2320.100	6.61	-0.22	0.53
02:50	2380.100	6.61	-0.22	0.53
03:50	2440.100	6.60	-0.21	0.54
04:50	2500.100	6.61	-0.22	0.53
05:50	2560.100	6.61	-0.22	0.53
06:50	2620.100	6.63	-0.24	0.51
07:50	2680.100	6.63	-0.24	0.51
08:50	2740.200	6.64	-0.25	0.50
09:50	2800.200	6.65	-0.26	0.49
10:50	2860.200	6.65	-0.26	0.49
11:50	2920.100	6.65	-0.26	0.49
12:50	2980.200	6.63	-0.24	0.51
13:50	3040.200	6.59	-0.20	0.55
14:50	3100.200	6.56	-0.17	0.58
15:50	3160.200	6.54	-0.15	0.60
16:50	3220.200	6.54	-0.15	0.60
17:50	3280.200	6.53	-0.14	0.61
18:50	3340.200	6.54	-0.15	0.60
19:50	3400.200	6.55	-0.16	0.59
20:50	3460.200	6.56	-0.17	0.58
21:50	3520.200	6.57	-0.18	0.57
22:50	3580.200	6.58	-0.19	0.56
23:50	3640.200	6.58	-0.19	0.56
00:50	3700.200	6.58	-0.19	0.56
01:50	3760.200	6.58	-0.19	0.56
02:50	3820.200	6.58	-0.19	0.56
03:50	3880.200	6.58	-0.19	0.56
04:50	3940.200	6.57	-0.18	0.57
05:50	4000.200	6.57	-0.18	0.57
06:50	4060.200	6.59	-0.20	0.55
07:50	4120.200	6.60	-0.21	0.54
08:50	4180.200	6.62	-0.23	0.52
09:50	4240.200	-999.99	1006.38	1007.13
10:50	4300.200	-999.99	1006.38	1007.13
11:04	4314.800	-999.99	1006.38	1007.13

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-4 INPUT 11
RADIUS: 34.651 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 7.66 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
09:00	0.000	7.66	0.00
09:00	0.017	-99.99	107.65
09:00	0.034	-99.99	107.65
09:00	0.050	-99.99	107.65
09:00	0.067	-99.99	107.65
09:00	0.084	-99.99	107.65
09:00	0.100	-99.99	107.65
09:00	0.117	-99.99	107.65
09:00	0.134	-99.99	107.65
09:00	0.150	-99.99	107.65
09:00	0.167	-99.99	107.65
09:00	0.257	7.66	0.00
09:00	0.340	7.66	0.00
09:00	0.424	7.66	0.00
09:00	0.507	7.66	0.00
09:00	0.590	7.66	0.00
09:00	0.674	7.66	0.00
09:00	0.757	7.66	0.00
09:00	0.840	7.66	0.00
09:00	0.924	7.66	0.00
09:01	1.007	7.66	0.00
09:01	1.414	7.66	0.00
09:01	1.748	7.66	0.00
09:02	2.081	7.66	0.00
09:02	2.414	7.66	0.00
09:02	2.748	7.66	0.00
09:03	3.081	7.66	0.00
09:03	3.415	7.66	0.00
09:03	3.748	7.66	0.00
09:04	4.081	7.66	0.00
09:04	4.414	7.66	0.00
09:04	4.748	7.66	0.00
09:05	5.081	7.66	0.00
09:05	5.414	7.66	0.00
09:05	5.748	7.66	0.00
09:06	6.081	7.66	0.00
09:06	6.415	7.66	0.00
09:06	6.748	7.66	0.00
09:07	7.081	7.66	0.00
09:07	7.415	7.66	0.00
09:07	7.748	7.66	0.00

09:08	8.081	7.66	0.00
09:08	8.415	7.66	0.00
09:08	8.748	7.66	0.00
09:09	9.081	7.66	0.00
09:09	9.414	7.66	0.00
09:09	9.748	7.66	0.00
09:10	10.081	7.66	0.00
09:12	12.108	7.66	0.00
09:14	14.152	7.66	0.00
09:16	16.152	7.66	0.00
09:18	18.152	7.66	0.00
09:20	20.152	7.66	0.00
09:22	22.152	7.66	0.00
09:24	24.152	7.66	0.00
09:26	26.152	7.66	0.00
09:28	28.215	7.66	0.00
09:30	30.197	7.65	0.01
09:32	32.197	7.66	0.00
09:34	34.197	7.66	0.00
09:36	36.197	7.66	0.00
09:38	38.197	7.66	0.00
09:40	40.197	7.66	0.00
09:42	42.197	7.66	0.00
09:44	44.197	7.66	0.00
09:46	46.197	7.66	0.00
09:48	48.197	7.66	0.00
09:50	50.197	7.66	0.00
09:52	52.197	7.66	0.00
09:54	54.197	7.66	0.00
09:56	56.217	7.65	0.01
09:58	58.100	7.65	0.01
10:00	60.245	7.65	0.01
10:02	62.245	7.65	0.01
10:04	64.245	7.65	0.01
10:06	66.245	7.65	0.01
10:08	68.245	7.65	0.01
10:10	70.245	7.65	0.01
10:12	72.245	7.65	0.01
10:14	74.245	7.65	0.01
10:16	76.245	7.65	0.01
10:18	78.245	7.65	0.01
10:20	80.245	7.65	0.01
10:22	82.245	7.65	0.01
10:24	84.245	7.65	0.01
10:26	86.245	7.65	0.01
10:28	88.245	7.65	0.01
10:30	90.245	7.65	0.01
10:32	92.245	7.65	0.01
10:34	94.245	7.65	0.01
10:36	96.245	7.64	0.02
10:38	98.245	7.64	0.02
11:00	120.210	7.64	0.02
11:20	140.210	7.63	0.03
11:40	160.210	7.62	0.04
12:00	180.220	7.61	0.05
12:20	200.220	7.60	0.06

12:40	220.220	7.58	0.08
13:00	240.220	7.57	0.09
13:20	260.220	7.55	0.11
13:40	280.230	7.53	0.13
14:00	300.230	7.50	0.16
14:20	320.230	7.50	0.16
14:40	340.180	7.49	0.17
15:00	360.100	7.48	0.18
15:20	380.100	7.46	0.20
15:40	400.100	7.45	0.21
16:00	420.170	7.44	0.22
16:20	440.250	7.43	0.23
16:40	460.200	7.42	0.24
17:00	480.170	7.41	0.25
17:20	500.170	7.41	0.25
17:40	520.130	7.40	0.26
18:00	540.120	7.40	0.26
18:20	560.220	7.39	0.27
18:40	580.080	7.39	0.27
19:00	600.220	7.39	0.27
19:20	620.230	7.39	0.27
19:40	640.220	7.39	0.27
20:00	660.220	7.38	0.28
20:20	680.130	7.38	0.28
20:40	700.120	7.38	0.28
21:00	720.230	7.38	0.28
21:20	740.300	7.38	0.28
21:40	760.230	7.39	0.27
22:00	780.230	7.39	0.27
22:20	800.230	7.39	0.27
22:40	820.180	7.40	0.26
23:00	840.570	7.39	0.27
23:20	860.180	7.38	0.28
23:40	880.080	7.38	0.28
00:00	900.170	7.38	0.28
00:20	920.170	7.38	0.28
00:40	940.170	7.38	0.28
01:00	960.170	7.37	0.29
01:20	980.170	7.36	0.30
01:40	1000.200	7.36	0.30
02:40	1060.300	7.35	0.31
03:40	1120.300	7.35	0.31
04:40	1180.300	7.34	0.32
05:40	1240.300	7.35	0.31
06:40	1300.300	7.35	0.31
07:40	1360.200	7.35	0.31
08:40	1420.200	7.36	0.30
09:40	1480.200	7.38	0.28
10:40	1540.200	7.38	0.28
11:40	1600.300	7.39	0.27
12:40	1660.300	7.39	0.27
13:40	1720.200	7.37	0.29
14:40	1780.300	7.35	0.31
15:40	1840.300	7.34	0.32
16:40	1900.300	7.32	0.34
17:40	1960.200	7.32	0.34

18:40	2020.200	7.32	0.34
19:40	2080.200	7.32	0.34
20:40	2140.200	7.33	0.33
21:40	2200.300	7.34	0.32
22:40	2260.300	7.34	0.32
23:40	2320.200	7.33	0.33
00:40	2380.200	7.32	0.34
01:40	2440.200	7.31	0.35
02:40	2500.200	7.31	0.35
03:40	2560.200	7.30	0.36
04:40	2620.200	7.29	0.37
05:40	2680.200	7.30	0.36
06:40	2740.200	7.30	0.36
07:40	2800.200	7.32	0.34
08:40	2860.300	7.33	0.33
09:40	2920.300	7.35	0.31
10:40	2980.300	7.36	0.30
11:40	3040.200	7.36	0.30
12:40	3100.200	7.33	0.33
13:40	3160.300	7.33	0.33
14:40	3220.300	7.30	0.36
15:40	3280.200	7.31	0.35
16:40	3340.200	7.28	0.38
17:40	3400.300	7.29	0.37
18:40	3460.300	7.30	0.36
19:40	3520.300	7.31	0.35
20:40	3580.200	7.32	0.34
21:40	3640.200	7.33	0.33
22:40	3700.200	7.33	0.33
23:40	3760.200	7.33	0.33
00:40	3820.200	7.32	0.34
01:40	3880.200	7.31	0.35
02:40	3940.200	7.31	0.35
03:40	4000.200	7.30	0.36
04:40	4060.200	7.29	0.37
05:40	4120.200	7.30	0.36
06:40	4180.200	7.31	0.35
07:40	4240.300	7.32	0.34
08:40	4300.300	7.32	0.34
09:40	4360.700	7.34	0.32
10:40	4420.300	7.33	0.33
11:40	4480.300	7.33	0.33
12:40	4540.300	7.31	0.35
13:40	4600.300	7.29	0.37
14:40	4660.300	7.28	0.38
15:40	4720.300	7.19	0.47
16:40	4780.300	7.23	0.43
17:40	4840.300	7.22	0.44
18:40	4900.300	7.22	0.44
19:40	4960.300	7.23	0.43
20:40	5020.300	7.23	0.43
21:40	5080.300	7.25	0.41
22:40	5140.300	7.24	0.42
23:40	5200.300	7.25	0.41
00:40	5260.300	7.24	0.42
01:40	5320.300	7.22	0.44

02:40	5380.300	7.22	0.44
03:40	5440.300	7.22	0.44
04:40	5500.300	7.20	0.46
05:40	5560.300	7.20	0.46
06:40	5620.300	7.22	0.44
07:40	5680.300	7.23	0.43
08:40	5740.300	7.22	0.44
09:40	5800.300	7.25	0.41
10:40	5860.300	7.26	0.40
11:40	5920.300	7.28	0.38
12:40	5980.300	7.27	0.39
13:40	6040.300	7.26	0.40
14:40	6100.300	7.20	0.46
15:40	6160.500	7.19	0.47
16:40	6220.300	7.19	0.47
17:40	6280.300	7.20	0.46
18:40	6340.300	7.24	0.42
19:40	6400.400	7.23	0.43
20:40	6460.200	7.24	0.42
21:40	6520.200	7.24	0.42
22:40	6580.300	7.24	0.42
23:40	6640.300	7.24	0.42
00:40	6700.300	7.24	0.42
01:40	6760.300	7.25	0.41
02:40	6820.300	7.23	0.43
03:40	6880.300	7.22	0.44
04:40	6940.300	7.20	0.46
05:40	7000.300	7.19	0.47
06:40	7060.300	7.22	0.44
07:40	7120.300	7.26	0.40
08:40	7180.300	7.31	0.35
09:40	7240.300	7.32	0.34
10:40	7300.300	7.31	0.35
11:40	7360.300	7.31	0.35
12:40	7420.300	7.30	0.36
13:40	7480.300	7.28	0.38
14:40	7540.300	7.24	0.42
15:40	7600.300	7.22	0.44
16:40	7660.300	7.20	0.46
17:40	7720.300	7.16	0.50
18:40	7780.200	7.16	0.50
19:40	7840.200	7.16	0.50
20:40	7900.300	7.13	0.53
21:40	7960.300	7.12	0.54
22:40	8020.300	7.10	0.56
23:40	8080.300	7.08	0.58
00:40	8140.300	7.04	0.62
01:40	8200.300	7.01	0.65
02:40	8260.300	6.98	0.68
03:40	8320.300	6.95	0.71
04:40	8380.300	6.92	0.74
05:40	8440.300	6.90	0.76
06:40	8500.300	6.90	0.76
07:40	8560.200	6.89	0.77
08:40	8620.300	6.90	0.76
09:00	8640.600	6.90	0.76

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 10-4 INPUT 11
RADIUS: 34.651 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 7.66 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	6.89	0.77
10:35	8735.071	6.88	0.78
10:45	8745.070	6.88	0.78
10:55	8755.072	6.88	0.78
11:05	8765.072	6.89	0.77
11:15	8775.072	6.91	0.75
11:25	8785.072	6.88	0.78
11:35	8795.072	6.87	0.79
11:45	8805.072	6.86	0.80
11:55	8815.102	6.86	0.80
12:05	8825.090	6.87	0.79
12:15	8835.090	6.86	0.80
12:25	8845.090	6.86	0.80
12:35	8855.090	6.85	0.81
12:45	8865.090	6.84	0.82
12:55	8875.120	6.84	0.82
13:04	8884.970	6.86	0.80
13:14	8894.970	6.85	0.81
13:25	8904.970	6.84	0.82
13:34	8914.970	6.83	0.83
13:45	8924.970	6.83	0.83
13:54	8934.970	6.81	0.85
14:05	8944.970	6.83	0.83
14:14	8955.020	6.82	0.84
14:25	8965.080	6.81	0.85
14:35	8975.080	6.80	0.86
14:45	8985.080	6.81	0.85
14:55	8995.080	6.81	0.85
15:05	9005.080	6.80	0.86
15:15	9015.080	6.79	0.87
15:25	9025.080	6.79	0.87
15:35	9035.080	6.79	0.87
15:45	9045.080	6.78	0.88
15:55	9055.080	6.77	0.89
16:04	9065.020	6.77	0.89
16:15	9075.020	6.77	0.89
16:25	9084.970	6.77	0.89
16:35	9095.080	6.76	0.90
16:45	9105.080	6.75	0.91
16:55	9115.080	6.75	0.91

ADJUSTED DATA

17:05	9125.080	6.74	0.92
17:15	9135.080	6.74	0.92
17:25	9145.080	6.75	0.91
17:35	9155.080	6.75	0.91
17:45	9165.080	6.76	0.90
17:55	9175.080	6.74	0.92
18:05	9185.080	6.74	0.92
18:15	9195.080	6.73	0.93
18:25	9205.080	6.72	0.94
18:35	9215.080	6.73	0.93
18:45	9225.080	6.73	0.93
18:55	9235.080	6.72	0.94
19:05	9245.080	6.72	0.94
19:15	9255.080	6.72	0.94
19:25	9265.080	6.72	0.94
19:35	9275.070	6.72	0.94
19:45	9285.080	6.72	0.94
19:55	9295.080	6.72	0.94
20:05	9305.080	6.72	0.94
20:15	9315.080	6.71	0.95
20:25	9325.080	6.72	0.94
20:35	9335.080	6.72	0.94
20:45	9345.080	6.72	0.94
20:55	9355.080	6.72	0.94
21:05	9365.080	6.73	0.93
21:15	9375.080	6.73	0.93
21:25	9385.080	6.73	0.93
21:35	9395.080	6.72	0.94
21:45	9405.080	6.73	0.93
21:55	9415.080	6.72	0.94
22:05	9425.080	6.72	0.94
22:15	9435.080	6.72	0.94
22:25	9445.080	6.72	0.94
22:35	9455.080	6.72	0.94
22:45	9465.080	6.72	0.94
22:54	9475.020	6.72	0.94
23:05	9485.020	6.72	0.94
23:14	9495.020	6.72	0.94
23:25	9505.020	6.71	0.95
23:34	9515.020	6.71	0.95
23:45	9525.020	6.71	0.95
23:55	9535.020	6.71	0.95
00:05	9545.020	6.70	0.96
00:15	9555.020	6.70	0.96
00:25	9565.030	6.70	0.96
00:35	9575.030	6.70	0.96
00:44	9585.030	6.70	0.96
00:55	9595.030	6.70	0.96
01:04	9605.030	6.70	0.96
01:15	9615.030	6.69	0.97
01:25	9625.030	6.69	0.97
01:35	9635.030	6.70	0.96
01:45	9645.030	6.70	0.96
01:55	9655.030	6.70	0.96
02:05	9665.030	6.70	0.96
02:14	9675.030	6.70	0.96

ADJUSTED DATA

02:25	9685.030	6.69	0.97
02:34	9695.030	6.69	0.97
02:45	9705.030	6.70	0.96
02:55	9715.030	6.70	0.96
03:04	9725.000	6.70	0.96
03:15	9735.000	6.69	0.97
03:24	9745.000	6.69	0.97
03:35	9755.100	6.69	0.97
03:44	9765.000	6.68	0.98
03:55	9775.000	6.68	0.98
04:04	9785.000	6.68	0.98
04:15	9795.000	6.68	0.98
04:25	9805.000	6.68	0.98
04:34	9815.000	6.68	0.98
04:45	9825.000	6.68	0.98
04:54	9835.000	6.68	0.98
05:05	9845.000	6.68	0.98
05:14	9855.000	6.68	0.98
05:25	9865.000	6.68	0.98
05:34	9875.000	6.68	0.98
05:45	9885.000	6.68	0.98
05:55	9895.000	6.68	0.98
06:04	9905.000	6.68	0.98
06:15	9915.000	6.68	0.98
06:24	9925.000	6.68	0.98
06:35	9935.000	6.68	0.98
06:44	9945.000	6.68	0.98
06:55	9955.000	6.68	0.98
07:05	9965.100	6.69	0.97
07:15	9975.100	6.69	0.97
07:25	9985.100	6.69	0.97
07:35	9995.100	6.70	0.96
07:45	10005.100	6.70	0.96
07:55	10015.100	6.70	0.96
08:05	10025.100	6.70	0.96
08:15	10035.100	6.71	0.95
08:25	10045.100	6.72	0.94
08:35	10055.100	6.72	0.94
08:45	10065.100	6.72	0.94
08:55	10075.000	6.72	0.94
09:04	10085.000	6.73	0.93
09:15	10095.000	6.73	0.93
09:24	10105.000	6.72	0.94
09:28	10108.200	6.72	0.94

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: REI 10-4 INPUT 11
RADIUS: 34.651 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 7.66 FEET
WATER STOP LEVEL: 6.87 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1006.86	1007.65
11:10	0.034	-999.99	1006.86	1007.65
11:10	0.050	-999.99	1006.86	1007.65
11:10	0.067	-999.99	1006.86	1007.65
11:10	0.084	-999.99	1006.86	1007.65
11:10	0.100	-999.99	1006.86	1007.65
11:10	0.117	-999.99	1006.86	1007.65
11:10	0.134	-999.99	1006.86	1007.65
11:10	0.150	-999.99	1006.86	1007.65
11:10	0.167	-999.99	1006.86	1007.65
11:10	0.257	6.87	0.00	0.79
11:10	0.341	6.87	0.00	0.79
11:10	0.424	6.87	0.00	0.79
11:10	0.507	6.87	0.00	0.79
11:10	0.591	6.87	0.00	0.79
11:10	0.674	6.87	0.00	0.79
11:10	0.757	6.87	0.00	0.79
11:10	0.841	6.87	0.00	0.79
11:10	0.924	6.87	0.00	0.79
11:11	1.007	6.87	0.00	0.79
11:11	1.413	6.88	-0.01	0.78
11:11	1.747	6.87	0.00	0.79
11:12	2.080	6.88	-0.01	0.78
11:12	2.413	6.88	-0.01	0.78
11:12	2.747	6.88	-0.01	0.78
11:13	3.080	6.89	-0.02	0.77
11:13	3.413	6.89	-0.02	0.77
11:13	3.747	6.89	-0.02	0.77
11:14	4.080	6.88	-0.01	0.78
11:14	4.413	6.88	-0.01	0.78
11:14	4.747	6.87	0.00	0.79
11:15	5.080	6.87	0.00	0.79
11:15	5.413	6.87	0.00	0.79
11:15	5.747	6.87	0.00	0.79
11:16	6.080	6.87	0.00	0.79
11:16	6.413	6.87	0.00	0.79
11:16	6.747	6.87	0.00	0.79
11:17	7.080	6.87	0.00	0.79

11:17	7.413	6.87	0.00	0.79
11:17	7.747	6.88	-0.01	0.78
11:18	8.080	6.87	0.00	0.79
11:18	8.413	6.87	0.00	0.79
11:18	8.747	6.87	0.00	0.79
11:19	9.080	6.87	0.00	0.79
11:19	9.413	6.87	0.00	0.79
11:19	9.747	6.87	0.00	0.79
11:20	10.080	6.87	0.00	0.79
11:22	12.115	6.88	-0.01	0.78
11:24	14.115	6.88	-0.01	0.78
11:26	16.115	6.89	-0.02	0.77
11:28	18.115	6.88	-0.01	0.78
11:30	20.115	6.89	-0.02	0.77
11:32	22.115	6.89	-0.02	0.77
11:34	24.115	6.88	-0.01	0.78
11:36	26.115	6.88	-0.01	0.78
11:38	28.115	6.87	0.00	0.79
11:40	30.115	6.87	0.00	0.79
11:42	32.115	6.87	0.00	0.79
11:44	34.115	6.87	0.00	0.79
11:46	36.115	6.88	-0.01	0.78
11:48	38.115	6.88	-0.01	0.78
11:50	40.115	6.89	-0.02	0.77
11:52	42.115	6.89	-0.02	0.77
11:54	44.115	6.88	-0.01	0.78
11:56	46.115	6.88	-0.01	0.78
11:58	48.115	6.87	0.00	0.79
12:00	50.115	6.87	0.00	0.79
12:02	52.115	6.87	0.00	0.79
12:04	54.115	6.87	0.00	0.79
12:06	56.115	6.87	0.00	0.79
12:08	58.115	6.88	-0.01	0.78
12:10	60.115	6.88	-0.01	0.78
12:12	62.102	6.88	-0.01	0.78
12:14	64.492	6.87	0.00	0.79
12:16	66.188	6.87	0.00	0.79
12:18	68.188	6.87	0.00	0.79
12:20	70.188	6.87	0.00	0.79
12:22	72.188	6.88	-0.01	0.78
12:24	74.188	6.87	0.00	0.79
12:26	76.188	6.87	0.00	0.79
12:28	78.188	6.87	0.00	0.79
12:30	80.188	6.86	0.01	0.80
12:32	82.188	6.86	0.01	0.80
12:34	84.188	6.86	0.01	0.80
12:36	86.188	6.86	0.01	0.80
12:38	88.188	6.88	-0.01	0.78
12:40	90.188	6.86	0.01	0.80
12:42	92.188	6.87	0.00	0.79
12:44	94.188	6.87	0.00	0.79
12:46	96.188	6.86	0.01	0.80
12:48	98.188	6.85	0.02	0.81
13:10	120.110	6.86	0.01	0.80
13:30	140.110	6.85	0.02	0.81
13:50	160.120	6.85	0.02	0.81

14:10	180.120	6.83	0.04	0.83
14:30	200.120	6.83	0.04	0.83
14:50	220.120	6.81	0.06	0.85
15:10	240.120	6.80	0.07	0.86
15:30	260.120	6.82	0.05	0.84
15:50	280.120	6.82	0.05	0.84
16:10	300.120	6.81	0.06	0.85
16:30	320.050	6.82	0.05	0.84
16:49	340.050	6.80	0.07	0.86
17:10	360.050	6.81	0.06	0.85
17:30	380.050	6.81	0.06	0.85
17:50	400.050	6.82	0.05	0.84
18:10	420.050	6.82	0.05	0.84
18:30	440.050	6.82	0.05	0.84
18:50	460.050	6.83	0.04	0.83
19:10	480.050	6.83	0.04	0.83
19:30	500.050	6.84	0.03	0.82
19:49	520.050	6.85	0.02	0.81
20:10	540.050	6.86	0.01	0.80
20:30	560.050	6.87	0.00	0.79
20:50	580.050	6.88	-0.01	0.78
21:10	600.050	6.89	-0.02	0.77
21:30	620.050	6.89	-0.02	0.77
21:50	640.050	6.90	-0.03	0.76
22:10	660.050	6.90	-0.03	0.76
22:30	680.050	6.91	-0.04	0.75
22:49	700.050	6.91	-0.04	0.75
23:10	720.050	6.92	-0.05	0.74
23:30	740.050	6.93	-0.06	0.73
23:50	760.100	6.93	-0.06	0.73
00:10	780.100	6.93	-0.06	0.73
00:30	800.100	6.94	-0.07	0.72
00:50	820.100	6.94	-0.07	0.72
01:10	840.100	6.94	-0.07	0.72
01:30	860.100	6.95	-0.08	0.71
01:50	880.100	6.95	-0.08	0.71
02:10	900.100	6.95	-0.08	0.71
02:30	920.100	6.96	-0.09	0.70
02:50	940.100	6.96	-0.09	0.70
03:10	960.100	6.96	-0.09	0.70
03:30	980.100	6.97	-0.10	0.69
03:50	1000.100	6.97	-0.10	0.69
04:50	1060.300	6.98	-0.11	0.68
05:50	1120.300	6.99	-0.12	0.67
06:50	1180.300	7.01	-0.14	0.65
07:50	1240.300	7.03	-0.16	0.63
08:50	1300.300	7.07	-0.20	0.59
09:50	1360.300	7.10	-0.23	0.56
10:50	1420.300	7.10	-0.23	0.56
11:50	1480.300	7.10	-0.23	0.56
12:50	1540.300	7.08	-0.21	0.58
13:50	1600.300	7.05	-0.18	0.61
14:50	1660.300	7.03	-0.16	0.63
15:50	1720.100	7.03	-0.16	0.63
16:50	1780.100	7.03	-0.16	0.63
17:50	1840.100	7.03	-0.16	0.63

18:50	1900.100	7.03	-0.16	0.63
19:50	1960.100	7.05	-0.18	0.61
20:50	2020.100	7.07	-0.20	0.59
21:50	2080.100	7.08	-0.21	0.58
22:50	2140.100	7.10	-0.23	0.56
23:50	2200.100	7.11	-0.24	0.55
00:50	2260.100	7.11	-0.24	0.55
01:50	2320.100	7.11	-0.24	0.55
02:50	2380.100	7.10	-0.23	0.56
03:50	2440.100	7.10	-0.23	0.56
04:50	2500.100	7.11	-0.24	0.55
05:50	2560.100	7.12	-0.25	0.54
06:50	2620.100	7.12	-0.25	0.54
07:50	2680.100	7.14	-0.27	0.52
08:50	2740.200	7.15	-0.28	0.51
09:50	2800.200	7.17	-0.30	0.49
10:50	2860.200	7.16	-0.29	0.50
11:50	2920.100	7.15	-0.28	0.51
12:50	2980.200	7.13	-0.26	0.53
13:50	3040.200	7.07	-0.20	0.59
14:50	3100.200	7.08	-0.21	0.58
15:50	3160.200	7.04	-0.17	0.62
16:50	3220.200	7.03	-0.16	0.63
17:50	3280.200	7.03	-0.16	0.63
18:50	3340.200	7.03	-0.16	0.63
19:50	3400.200	7.05	-0.18	0.61
20:50	3460.200	7.06	-0.19	0.60
21:50	3520.200	7.07	-0.20	0.59
22:50	3580.200	7.08	-0.21	0.58
23:50	3640.200	7.07	-0.20	0.59
00:50	3700.200	7.07	-0.20	0.59
01:50	3760.200	7.07	-0.20	0.59
02:50	3820.200	7.07	-0.20	0.59
03:50	3880.200	7.07	-0.20	0.59
04:50	3940.200	7.07	-0.20	0.59
05:50	4000.200	7.07	-0.20	0.59
06:50	4060.200	7.08	-0.21	0.58
07:50	4120.200	7.10	-0.23	0.56
08:50	4180.200	7.12	-0.25	0.54
09:50	4240.200	-999.99	1006.86	1007.65
10:50	4300.200	-999.99	1006.86	1007.65
11:04	4314.800	-999.99	1006.86	1007.65

12:40	220.220	38.82	0.00
13:00	240.220	38.82	0.00
13:20	260.220	38.82	0.00
13:40	280.230	38.82	0.00
14:00	300.230	38.82	0.00
14:20	320.230	38.82	0.00
14:40	340.180	38.82	0.00
15:00	360.100	38.80	0.02
15:20	380.100	38.82	0.00
15:40	400.100	38.82	0.00
16:00	420.170	38.82	0.00
16:20	440.250	38.82	0.00
16:40	460.200	38.82	0.00
17:00	480.170	38.82	0.00
17:20	500.170	38.82	0.00
17:40	520.130	38.82	0.00
18:00	540.120	38.82	0.00
18:20	560.220	38.82	0.00
18:40	580.080	38.82	0.00
19:00	600.220	38.82	0.00
19:20	620.230	38.82	0.00
19:40	640.220	38.82	0.00
20:00	660.220	38.82	0.00
20:20	680.130	38.82	0.00
20:40	700.120	38.82	0.00
21:00	720.230	38.82	0.00
21:20	740.300	38.82	0.00
21:40	760.230	38.82	0.00
22:00	780.230	38.82	0.00
22:20	800.230	38.82	0.00
22:40	820.180	38.82	0.00
23:00	840.570	38.82	0.00
23:20	860.180	38.82	0.00
23:40	880.080	38.82	0.00
00:00	900.170	38.82	0.00
00:20	920.170	38.82	0.00
00:40	940.170	38.82	0.00
01:00	960.170	38.82	0.00
01:20	980.170	38.82	0.00
01:40	1000.200	38.82	0.00
02:40	1060.300	38.82	0.00
03:40	1120.300	38.82	0.00
04:40	1180.300	38.82	0.00
05:40	1240.300	38.82	0.00
06:40	1300.300	38.83	-0.01
07:40	1360.200	38.83	-0.01
08:40	1420.200	38.83	-0.01
09:40	1480.200	38.83	-0.01
10:40	1540.200	38.83	-0.01
11:40	1600.300	38.83	-0.01
12:40	1660.300	38.83	-0.01
13:40	1720.200	38.83	-0.01
14:40	1780.300	38.83	-0.01
15:40	1840.300	38.82	0.00
16:40	1900.300	38.82	0.00
17:40	1960.200	38.81	0.01

18:40	2020.200	38.81	0.01
19:40	2080.200	38.81	0.01
20:40	2140.200	38.81	0.01
21:40	2200.300	38.81	0.01
22:40	2260.300	38.81	0.01
23:40	2320.200	38.81	0.01
00:40	2380.200	38.81	0.01
01:40	2440.200	38.81	0.01
02:40	2500.200	38.81	0.01
03:40	2560.200	38.82	0.00
04:40	2620.200	38.81	0.01
05:40	2680.200	38.81	0.01
06:40	2740.200	38.82	0.00
07:40	2800.200	38.82	0.00
08:40	2860.300	38.82	0.00
09:40	2920.300	38.81	0.01
10:40	2980.300	38.81	0.01
11:40	3040.200	38.81	0.01
12:40	3100.200	38.81	0.01
13:40	3160.300	38.81	0.01
14:40	3220.300	38.82	0.00
15:40	3280.200	38.82	0.00
16:40	3340.200	38.81	0.01
17:40	3400.300	38.81	0.01
18:40	3460.300	38.81	0.01
19:40	3520.300	38.81	0.01
20:40	3580.200	38.82	0.00
21:40	3640.200	38.81	0.01
22:40	3700.200	38.81	0.01
23:40	3760.200	38.81	0.01
00:40	3820.200	38.81	0.01
01:40	3880.200	38.81	0.01
02:40	3940.200	38.81	0.01
03:40	4000.200	38.81	0.01
04:40	4060.200	38.81	0.01
05:40	4120.200	38.81	0.01
06:40	4180.200	38.81	0.01
07:40	4240.300	38.81	0.01
08:40	4300.300	38.81	0.01
09:40	4360.700	38.81	0.01
10:40	4420.300	38.81	0.01
11:40	4480.300	38.81	0.01
12:40	4540.300	38.81	0.01
13:40	4600.300	38.81	0.01
14:40	4660.300	38.81	0.01
15:40	4720.300	38.81	0.01
16:40	4780.300	38.81	0.01
17:40	4840.300	38.81	0.01
18:40	4900.300	38.81	0.01
19:40	4960.300	38.81	0.01
20:40	5020.300	38.81	0.01
21:40	5080.300	38.81	0.01
22:40	5140.300	38.81	0.01
23:40	5200.300	38.81	0.01
00:40	5260.300	38.80	0.02
01:40	5320.300	38.81	0.01

02:40	5380.300	38.81	0.01
03:40	5440.300	38.81	0.01
04:40	5500.300	38.80	0.02
05:40	5560.300	38.80	0.02
06:40	5620.300	38.80	0.02
07:40	5680.300	38.81	0.01
08:40	5740.300	38.81	0.01
09:40	5800.300	38.81	0.01
10:40	5860.300	38.81	0.01
11:40	5920.300	38.81	0.01
12:40	5980.300	38.81	0.01
13:40	6040.300	38.81	0.01
14:40	6100.300	38.81	0.01
15:40	6160.500	38.81	0.01
16:40	6220.300	38.80	0.02
17:40	6280.300	38.81	0.01
18:40	6340.300	38.81	0.01
19:40	6400.400	38.81	0.01
20:40	6460.200	38.80	0.02
21:40	6520.200	38.80	0.02
22:40	6580.300	38.80	0.02
23:40	6640.300	38.80	0.02
00:40	6700.300	38.80	0.02
01:40	6760.300	38.80	0.02
02:40	6820.300	38.81	0.01
03:40	6880.300	38.81	0.01
04:40	6940.300	38.81	0.01
05:40	7000.300	38.81	0.01
06:40	7060.300	38.82	0.00
07:40	7120.300	38.82	0.00
08:40	7180.300	38.81	0.01
09:40	7240.300	38.80	0.02
10:40	7300.300	38.79	0.03
11:40	7360.300	38.78	0.04
12:40	7420.300	38.78	0.04
13:40	7480.300	38.78	0.04
14:40	7540.300	38.78	0.04
15:40	7600.300	38.77	0.05
16:40	7660.300	38.77	0.05
17:40	7720.300	38.77	0.05
18:40	7780.200	38.77	0.05
19:40	7840.200	38.76	0.06
20:40	7900.300	38.76	0.06
21:40	7960.300	38.76	0.06
22:40	8020.300	38.76	0.06
23:40	8080.300	38.76	0.06
00:40	8140.300	38.75	0.07
01:40	8200.300	38.75	0.07
02:40	8260.300	38.75	0.07
03:40	8320.300	38.75	0.07
04:40	8380.300	38.75	0.07
05:40	8440.300	38.75	0.07
06:40	8500.300	38.74	0.08
07:40	8560.200	38.75	0.07
08:40	8620.300	38.74	0.08
09:00	8640.600	38.74	0.08

20:50	2020.100	39.64	0.01	0.08
21:50	2080.100	39.64	0.01	0.08
22:50	2140.100	39.64	0.01	0.08
23:50	2200.100	39.64	0.01	0.08
00:50	2260.100	39.64	0.01	0.08
01:50	2320.100	39.64	0.01	0.08
02:50	2380.100	39.64	0.01	0.08
03:50	2440.100	39.64	0.01	0.08
04:50	2500.100	39.64	0.01	0.08
05:50	2560.100	39.64	0.01	0.08
06:50	2620.100	39.64	0.01	0.08
07:50	2680.100	39.64	0.01	0.08
08:50	2740.200	39.64	0.01	0.08
09:50	2800.200	39.64	0.01	0.08
10:50	2860.200	39.64	0.01	0.08
11:50	2920.100	39.64	0.01	0.08
12:50	2980.200	39.64	0.01	0.08
13:50	3040.200	39.64	0.01	0.08
14:50	3100.200	39.64	0.01	0.08
15:50	3160.200	39.64	0.01	0.08
16:50	3220.200	39.64	0.01	0.08
17:50	3280.200	39.64	0.01	0.08
18:50	3340.200	39.64	0.01	0.08
19:50	3400.200	39.64	0.01	0.08
20:50	3460.200	39.63	0.02	0.09
21:50	3520.200	39.64	0.01	0.08
22:50	3580.200	39.64	0.01	0.08
23:50	3640.200	39.64	0.01	0.08
00:50	3700.200	39.64	0.01	0.08
01:50	3760.200	39.63	0.02	0.09
02:50	3820.200	39.64	0.01	0.08
03:50	3880.200	39.64	0.01	0.08
04:50	3940.200	39.64	0.01	0.08
05:50	4000.200	39.63	0.02	0.09
06:50	4060.200	39.63	0.02	0.09
07:50	4120.200	39.63	0.02	0.09
08:50	4180.200	39.64	0.01	0.08
09:50	4240.200	-999.99	1039.64	1039.71
10:50	4300.200	-999.99	1039.64	1039.71
11:04	4314.800	-999.99	1039.64	1039.71

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : REI 12-1
RADIUS: 1492.112 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 77.64 FEET

TIME	ELAPSED TIME (MIN)	WATER LEVEL (FEET)	DELTA HEAD (FEET)	t/r2
09:29	29.0	77.64	0.00	9.05E-09
11:22	142.0	77.66	-0.02	4.43E-08
13:16	256.0	77.81	-0.17	7.98E-08
15:23	383.0	78.08	-0.44	1.19E-07
19:26	626.0	78.71	-1.07	1.95E-07
22:05	785.0	79.11	-1.47	2.45E-07
23:24	864.0	79.39	-1.75	2.69E-07
01:08	968.0	79.59	-1.95	3.02E-07
03:25	1105.0	79.95	-2.31	3.45E-07
05:15	1215.0	80.23	-2.59	3.79E-07
07:26	1346.0	80.54	-2.90	4.20E-07
09:50	1490.0	80.88	-3.24	4.65E-07
11:37	1597.0	81.25	-3.61	4.98E-07
13:45	1725.0	81.34	-3.70	5.38E-07
15:35	1835.0	81.59	-3.95	5.72E-07
17:31	1951.0	81.77	-4.13	6.09E-07
19:43	2083.0	81.82	-4.18	6.50E-07
21:25	2185.0	82.22	-4.58	6.82E-07
23:27	2307.0	82.38	-4.74	7.20E-07
01:26	2426.0	82.59	-4.95	7.57E-07
03:52	2572.0	82.86	-5.22	8.02E-07
05:25	2665.0	82.96	-5.32	8.31E-07
07:05	2765.0	83.12	-5.48	8.62E-07
09:34	2914.0	83.35	-5.71	9.09E-07
11:43	3043.0	83.53	-5.89	9.49E-07
13:37	3157.0	83.69	-6.05	9.85E-07
15:55	3295.0	83.89	-6.25	1.03E-06
17:30	3390.0	84.02	-6.38	1.06E-06
20:00	3540.0	84.19	-6.55	1.10E-06
21:32	3632.0	84.34	-6.70	1.13E-06
23:54	3774.0	84.45	-6.81	1.18E-06
03:42	4002.0	84.72	-7.08	1.25E-06
07:22	4222.0	84.96	-7.32	1.32E-06
09:40	4360.0	85.11	-7.47	1.36E-06
11:36	4476.0	85.22	-7.58	1.40E-06
13:56	4616.0	85.35	-7.71	1.44E-06
15:44	4724.0	85.46	-7.82	1.47E-06
17:30	4830.0	85.56	-7.92	1.51E-06
19:28	4948.0	85.68	-8.04	1.54E-06

21:29	5069.0	85.73	-8.09	1.58E-06
23:33	5193.0	85.88	-8.24	1.62E-06
03:38	5437.0	86.03	-8.39	1.70E-06
07:18	5657.0	86.21	-8.57	1.76E-06
09:31	5790.0	86.33	-8.69	1.81E-06
11:35	5914.0	86.39	-8.75	1.84E-06
15:27	6146.0	86.67	-9.03	1.92E-06
17:46	6285.0	86.69	-9.05	1.96E-06
19:39	6398.0	86.78	-9.14	2.00E-06
22:00	6539.0	86.84	-9.20	2.04E-06
23:29	6628.0	86.86	-9.22	2.07E-06
02:01	6780.0	87.02	-9.38	2.11E-06
03:51	6890.0	87.02	-9.38	2.15E-06
05:45	7004.0	87.13	-9.49	2.18E-06
07:46	7125.0	87.13	-9.49	2.22E-06
09:48	7247.0	87.13	-9.49	2.26E-06
11:42	7361.0	87.43	-9.79	2.30E-06
13:34	7473.0	87.13	-9.49	2.33E-06
15:38	7597.0	87.15	-9.51	2.37E-06
17:38	7717.0	87.61	-9.97	2.41E-06
23:55	8094.0	87.72	-10.08	2.52E-06
07:27	8546.0	87.57	-9.93	2.67E-06
14:53	8992.0	87.73	-10.09	2.80E-06
19:55	9294.0	87.87	-10.23	2.90E-06
23:44	9523.0	87.98	-10.34	2.97E-06
03:53	9772.0	88.13	-10.49	3.05E-06
07:25	9984.0	88.22	-10.58	3.11E-06
09:33	10112.0	88.30	-10.66	3.15E-06

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : P 10-2 INPUT 6
RADIUS: 20.845 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 46.06 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
09:00	0.000	46.06	0.00
09:00	0.017	-99.99	146.05
09:00	0.034	-99.99	146.05
09:00	0.050	-99.99	146.05
09:00	0.067	-99.99	146.05
09:00	0.084	-99.99	146.05
09:00	0.100	-99.99	146.05
09:00	0.117	-99.99	146.05
09:00	0.134	-99.99	146.05
09:00	0.150	-99.99	146.05
09:00	0.167	-99.99	146.05
09:00	0.257	46.05	0.01
09:00	0.340	46.05	0.01
09:00	0.424	46.05	0.01
09:00	0.507	46.05	0.01
09:00	0.590	46.05	0.01
09:00	0.674	46.05	0.01
09:00	0.757	46.05	0.01
09:00	0.840	46.05	0.01
09:00	0.924	46.04	0.02
09:01	1.007	46.04	0.02
09:01	1.414	46.04	0.02
09:01	1.748	46.03	0.03
09:02	2.081	46.03	0.03
09:02	2.414	46.03	0.03
09:02	2.748	46.02	0.04
09:03	3.081	46.02	0.04
09:03	3.415	46.01	0.05
09:03	3.748	46.01	0.05
09:04	4.081	46.01	0.05
09:04	4.414	46.01	0.05
09:04	4.748	46.01	0.05
09:05	5.081	46.00	0.06
09:05	5.414	46.00	0.06
09:05	5.748	46.00	0.06
09:06	6.081	46.00	0.06
09:06	6.415	46.00	0.06
09:06	6.748	46.00	0.06
09:07	7.081	45.99	0.07
09:07	7.415	45.99	0.07
09:07	7.748	45.99	0.07

09:08	8.081	45.99	0.07
09:08	8.415	45.99	0.07
09:08	8.748	45.99	0.07
09:09	9.081	45.99	0.07
09:09	9.414	45.99	0.07
09:09	9.748	45.99	0.07
09:10	10.081	45.99	0.07
09:12	12.108	45.98	0.08
09:14	14.152	45.98	0.08
09:16	16.152	45.98	0.08
09:18	18.152	45.98	0.08
09:20	20.152	45.97	0.09
09:22	22.152	45.97	0.09
09:24	24.152	45.97	0.09
09:26	26.152	45.98	0.08
09:28	28.215	45.98	0.08
09:30	30.197	45.98	0.08
09:32	32.197	45.98	0.08
09:34	34.197	45.99	0.07
09:36	36.197	45.99	0.07
09:38	38.197	45.99	0.07
09:40	40.197	45.99	0.07
09:42	42.197	45.99	0.07
09:44	44.197	45.99	0.07
09:46	46.197	45.99	0.07
09:48	48.197	45.99	0.07
09:50	50.197	45.99	0.07
09:52	52.197	45.99	0.07
09:54	54.197	45.99	0.07
09:56	56.217	45.98	0.08
09:58	58.100	45.98	0.08
10:00	60.245	45.97	0.09
10:02	62.245	45.97	0.09
10:04	64.245	45.97	0.09
10:06	66.245	45.97	0.09
10:08	68.245	45.97	0.09
10:10	70.245	45.96	0.10
10:12	72.245	45.96	0.10
10:14	74.245	45.97	0.09
10:16	76.245	45.97	0.09
10:18	78.245	45.97	0.09
10:20	80.245	45.97	0.09
10:22	82.245	45.98	0.08
10:24	84.245	45.98	0.08
10:26	86.245	45.98	0.08
10:28	88.245	45.99	0.07
10:30	90.245	45.99	0.07
10:32	92.245	45.98	0.08
10:34	94.245	45.99	0.07
10:36	96.245	45.98	0.08
10:38	98.245	45.98	0.08
11:00	120.210	45.96	0.10
11:20	140.210	45.97	0.09
11:40	160.210	45.98	0.08
12:00	180.220	45.99	0.07
12:20	200.220	45.96	0.10

12:40	220.220	45.97	0.09
13:00	240.220	45.99	0.07
13:20	260.220	45.99	0.07
13:40	280.230	45.96	0.10
14:00	300.230	46.00	0.06
14:20	320.230	45.94	0.12
14:40	340.180	45.96	0.10
15:00	360.100	45.99	0.07
15:20	380.100	45.97	0.09
15:40	400.100	45.96	0.10
16:00	420.170	45.89	0.17
16:20	440.250	45.88	0.18
16:40	460.200	45.90	0.16
17:00	480.170	45.92	0.14
17:20	500.170	45.92	0.14
17:40	520.130	45.90	0.16
18:00	540.120	45.93	0.13
18:20	560.220	45.93	0.13
18:40	580.080	45.93	0.13
19:00	600.220	45.93	0.13
19:20	620.230	45.93	0.13
19:40	640.220	45.94	0.12
20:00	660.220	45.94	0.12
20:20	680.130	45.95	0.11
20:40	700.120	45.95	0.11
21:00	720.230	45.90	0.16
21:20	740.300	45.90	0.16
21:40	760.230	45.92	0.14
22:00	780.230	45.92	0.14
22:20	800.230	45.92	0.14
22:40	820.180	45.92	0.14
23:00	840.570	45.94	0.12
23:20	860.180	45.94	0.12
23:40	880.080	45.93	0.13
00:00	900.170	45.94	0.12
00:20	920.170	45.94	0.12
00:40	940.170	45.94	0.12
01:00	960.170	45.94	0.12
01:20	980.170	45.94	0.12
01:40	1000.200	45.94	0.12
02:40	1060.300	45.94	0.12
03:40	1120.300	45.94	0.12
04:40	1180.300	45.96	0.10
05:40	1240.300	45.95	0.11
06:40	1300.300	46.01	0.05
07:40	1360.200	45.94	0.12
08:40	1420.200	45.95	0.11
09:40	1480.200	45.99	0.07
10:40	1540.200	45.93	0.13
11:40	1600.300	45.94	0.12
12:40	1660.300	45.89	0.17
13:40	1720.200	45.87	0.19
14:40	1780.300	45.98	0.08
15:40	1840.300	45.98	0.08
16:40	1900.300	45.96	0.10
17:40	1960.200	45.95	0.11

18:40	2020.200	45.90	0.16
19:40	2080.200	45.83	0.23
20:40	2140.200	45.80	0.26
21:40	2200.300	45.77	0.29
22:40	2260.300	45.78	0.28
23:40	2320.200	45.87	0.19
00:40	2380.200	45.88	0.18
01:40	2440.200	45.83	0.23
02:40	2500.200	45.76	0.30
03:40	2560.200	45.84	0.22
04:40	2620.200	45.68	0.38
05:40	2680.200	45.67	0.39
06:40	2740.200	45.75	0.31
07:40	2800.200	45.83	0.23
08:40	2860.300	45.77	0.29
09:40	2920.300	45.74	0.32
10:40	2980.300	45.80	0.26
11:40	3040.200	45.84	0.22
12:40	3100.200	45.87	0.19
13:40	3160.300	45.82	0.24
14:40	3220.300	45.80	0.26
15:40	3280.200	45.83	0.23
16:40	3340.200	45.83	0.23
17:40	3400.300	45.78	0.28
18:40	3460.300	45.80	0.26
19:40	3520.300	45.79	0.27
20:40	3580.200	45.80	0.26
21:40	3640.200	45.81	0.25
22:40	3700.200	45.81	0.25
23:40	3760.200	45.86	0.20
00:40	3820.200	45.91	0.15
01:40	3880.200	45.91	0.15
02:40	3940.200	45.90	0.16
03:40	4000.200	45.89	0.17
04:40	4060.200	45.88	0.18
05:40	4120.200	45.86	0.20
06:40	4180.200	45.85	0.21
07:40	4240.300	45.82	0.24
08:40	4300.300	45.83	0.23
09:40	4360.700	45.89	0.17
10:40	4420.300	45.87	0.19
11:40	4480.300	45.82	0.24
12:40	4540.300	45.90	0.16
13:40	4600.300	45.86	0.20
14:40	4660.300	45.87	0.19
15:40	4720.300	45.78	0.28
16:40	4780.300	45.86	0.20
17:40	4840.300	45.81	0.25
18:40	4900.300	45.82	0.24
19:40	4960.300	45.82	0.24
20:40	5020.300	45.85	0.21
21:40	5080.300	45.83	0.23
22:40	5140.300	45.84	0.22
23:40	5200.300	45.85	0.21
00:40	5260.300	45.86	0.20
01:40	5320.300	45.86	0.20

02:40	5380.300	45.85	0.21
03:40	5440.300	45.87	0.19
04:40	5500.300	45.88	0.18
05:40	5560.300	45.87	0.19
06:40	5620.300	45.85	0.21
07:40	5680.300	45.85	0.21
08:40	5740.300	45.91	0.15
09:40	5800.300	45.96	0.10
10:40	5860.300	45.95	0.11
11:40	5920.300	45.91	0.15
12:40	5980.300	45.96	0.10
13:40	6040.300	45.93	0.13
14:40	6100.300	46.06	0.00
15:40	6160.500	46.07	-0.01
16:40	6220.300	46.03	0.03
17:40	6280.300	45.85	0.21
18:40	6340.300	45.83	0.23
19:40	6400.400	45.81	0.25
20:40	6460.200	45.86	0.20
21:40	6520.200	45.89	0.17
22:40	6580.300	45.90	0.16
23:40	6640.300	45.90	0.16
00:40	6700.300	45.91	0.15
01:40	6760.300	45.91	0.15
02:40	6820.300	45.93	0.13
03:40	6880.300	45.96	0.10
04:40	6940.300	45.98	0.08
05:40	7000.300	45.99	0.07
06:40	7060.300	45.93	0.13
07:40	7120.300	45.71	0.35
08:40	7180.300	45.58	0.48
09:40	7240.300	45.56	0.50
10:40	7300.300	45.57	0.49
11:40	7360.300	45.54	0.52
12:40	7420.300	45.46	0.60
13:40	7480.300	45.40	0.66
14:40	7540.300	45.34	0.72
15:40	7600.300	45.22	0.84
16:40	7660.300	45.15	0.91
17:40	7720.300	45.14	0.92
18:40	7780.200	45.05	1.01
19:40	7840.200	45.00	1.06
20:40	7900.300	45.02	1.04
21:40	7960.300	45.02	1.04
22:40	8020.300	45.03	1.03
23:40	8080.300	45.08	0.98
00:40	8140.300	45.07	0.99
01:40	8200.300	45.10	0.96
02:40	8260.300	45.15	0.91
03:40	8320.300	45.19	0.87
04:40	8380.300	45.22	0.84
05:40	8440.300	45.28	0.78
06:40	8500.300	45.35	0.71
07:40	8560.200	45.39	0.67
08:40	8620.300	45.36	0.70
09:00	8640.600	45.37	0.69

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : P 10-2 INPUT 6
RADIUS: 20.854 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 46.06 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	45.38	0.68
10:35	8735.071	45.39	0.67
10:45	8745.070	45.40	0.66
10:55	8755.072	45.41	0.65
11:05	8765.072	45.39	0.67
11:15	8775.072	45.38	0.68
11:25	8785.072	45.46	0.60
11:35	8795.072	45.47	0.59
11:45	8805.072	45.49	0.57
11:55	8815.102	45.51	0.55
12:05	8825.090	45.50	0.56
12:15	8835.090	45.52	0.54
12:25	8845.090	45.51	0.55
12:35	8855.090	45.51	0.55
12:45	8865.090	45.53	0.53
12:55	8875.120	45.56	0.50
13:04	8884.970	45.52	0.54
13:14	8894.970	45.51	0.55
13:25	8904.970	45.53	0.53
13:34	8914.970	45.56	0.50
13:45	8924.970	45.57	0.49
13:54	8934.970	45.57	0.49
14:05	8944.970	45.55	0.51
14:14	8955.020	45.55	0.51
14:25	8965.080	45.58	0.48
14:35	8975.080	45.59	0.47
14:45	8985.080	45.58	0.48
14:55	8995.080	45.60	0.46
15:05	9005.080	45.58	0.48
15:15	9015.080	45.57	0.49
15:25	9025.080	45.56	0.50
15:35	9035.080	45.57	0.49
15:45	9045.080	45.56	0.50
15:55	9055.080	45.55	0.51
16:04	9065.020	45.55	0.51
16:15	9075.020	45.57	0.49
16:25	9084.970	45.54	0.52
16:35	9095.080	45.55	0.51
16:45	9105.080	45.56	0.50
16:55	9115.080	45.59	0.47

ADJUSTED DATA

17:05	9125.080	45.57	0.49
17:15	9135.080	45.57	0.49
17:25	9145.080	45.57	0.49
17:35	9155.080	45.55	0.51
17:45	9165.080	45.55	0.51
17:55	9175.080	45.57	0.49
18:05	9185.080	45.56	0.50
18:15	9195.080	45.57	0.49
18:25	9205.080	45.56	0.50
18:35	9215.080	45.55	0.51
18:45	9225.080	45.56	0.50
18:55	9235.080	45.56	0.50
19:05	9245.080	45.55	0.51
19:15	9255.080	45.55	0.51
19:25	9265.080	45.55	0.51
19:35	9275.070	45.54	0.52
19:45	9285.080	45.54	0.52
19:55	9295.080	45.55	0.51
20:05	9305.080	45.55	0.51
20:15	9315.080	45.55	0.51
20:25	9325.080	45.55	0.51
20:35	9335.080	45.55	0.51
20:45	9345.080	45.55	0.51
20:55	9355.080	45.55	0.51
21:05	9365.080	45.54	0.52
21:15	9375.080	45.55	0.51
21:25	9385.080	45.55	0.51
21:35	9395.080	45.55	0.51
21:45	9405.080	45.55	0.51
21:55	9415.080	45.55	0.51
22:05	9425.080	45.54	0.52
22:15	9435.080	45.54	0.52
22:25	9445.080	45.55	0.51
22:35	9455.080	45.55	0.51
22:45	9465.080	45.55	0.51
22:54	9475.020	45.55	0.51
23:05	9485.020	45.54	0.52
23:14	9495.020	45.53	0.53
23:25	9505.020	45.52	0.54
23:34	9515.020	45.50	0.56
23:45	9525.020	45.51	0.55
23:55	9535.020	45.51	0.55
00:05	9545.020	45.51	0.55
00:15	9555.020	45.52	0.54
00:25	9565.030	45.53	0.53
00:35	9575.030	45.52	0.54
00:44	9585.030	45.51	0.55
00:55	9595.030	45.52	0.54
01:04	9605.030	45.54	0.52
01:15	9615.030	45.54	0.52
01:25	9625.030	45.53	0.53
01:35	9635.030	45.53	0.53
01:45	9645.030	45.53	0.53
01:55	9655.030	45.53	0.53
02:05	9665.030	45.54	0.52
02:14	9675.030	45.55	0.51

ADJUSTED DATA

02:25	9685.030	45.55	0.51
02:34	9695.030	45.55	0.51
02:45	9705.030	45.55	0.51
02:55	9715.030	45.55	0.51
03:04	9725.000	45.56	0.50
03:15	9735.000	45.56	0.50
03:24	9745.000	45.56	0.50
03:35	9755.100	45.55	0.51
03:44	9765.000	45.55	0.51
03:55	9775.000	45.55	0.51
04:04	9785.000	45.54	0.52
04:15	9795.000	45.53	0.53
04:25	9805.000	45.53	0.53
04:34	9815.000	45.53	0.53
04:45	9825.000	45.53	0.53
04:54	9835.000	45.52	0.54
05:05	9845.000	45.52	0.54
05:14	9855.000	45.52	0.54
05:25	9865.000	45.53	0.53
05:34	9875.000	45.52	0.54
05:45	9885.000	45.53	0.53
05:55	9895.000	45.53	0.53
06:04	9905.000	45.54	0.52
06:15	9915.000	45.54	0.52
06:24	9925.000	45.53	0.53
06:35	9935.000	45.54	0.52
06:44	9945.000	45.55	0.51
06:55	9955.000	45.55	0.51
07:05	9965.100	45.55	0.51
07:15	9975.100	45.55	0.51
07:25	9985.100	45.55	0.51
07:35	9995.100	45.55	0.51
07:45	10005.100	45.55	0.51
07:55	10015.100	45.55	0.51
08:05	10025.100	45.55	0.51
08:15	10035.100	45.57	0.49
08:25	10045.100	45.58	0.48
08:35	10055.100	45.61	0.45
08:45	10065.100	45.63	0.43
08:55	10075.000	45.64	0.42
09:04	10085.000	45.68	0.38
09:15	10095.000	45.67	0.39
09:24	10105.000	45.69	0.37
09:28	10108.200	45.70	0.36

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: P 10-2 INPUT 6
RADIUS: 20.854 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 46.06 FEET
WATER STOP LEVEL: 45.83 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1045.82	1046.05
11:10	0.034	-999.99	1045.82	1046.05
11:10	0.050	-999.99	1045.82	1046.05
11:10	0.067	-999.99	1045.82	1046.05
11:10	0.084	-999.99	1045.82	1046.05
11:10	0.100	-999.99	1045.82	1046.05
11:10	0.117	-999.99	1045.82	1046.05
11:10	0.134	-999.99	1045.82	1046.05
11:10	0.150	-999.99	1045.82	1046.05
11:10	0.167	-999.99	1045.82	1046.05
11:10	0.257	45.83	0.00	0.23
11:10	0.341	45.83	0.00	0.23
11:10	0.424	45.83	0.00	0.23
11:10	0.507	45.83	0.00	0.23
11:10	0.591	45.83	0.00	0.23
11:10	0.674	45.83	0.00	0.23
11:10	0.757	45.83	0.00	0.23
11:10	0.841	45.83	0.00	0.23
11:10	0.924	45.83	0.00	0.23
11:11	1.007	45.84	-0.01	0.22
11:11	1.413	45.84	-0.01	0.22
11:11	1.747	45.85	-0.02	0.21
11:12	2.080	45.85	-0.02	0.21
11:12	2.413	45.86	-0.03	0.20
11:12	2.747	45.87	-0.04	0.19
11:13	3.080	45.88	-0.05	0.18
11:13	3.413	45.89	-0.06	0.17
11:13	3.747	45.89	-0.06	0.17
11:14	4.080	45.90	-0.07	0.16
11:14	4.413	45.90	-0.07	0.16
11:14	4.747	45.90	-0.07	0.16
11:15	5.080	45.90	-0.07	0.16
11:15	5.413	45.90	-0.07	0.16
11:15	5.747	45.91	-0.08	0.15
11:16	6.080	45.91	-0.08	0.15
11:16	6.413	45.91	-0.08	0.15
11:16	6.747	45.91	-0.08	0.15
11:17	7.080	45.91	-0.08	0.15
11:17	7.413	45.91	-0.08	0.15
11:17	7.747	45.91	-0.08	0.15

11:18	8.080	45.91	-0.08	0.15
11:18	8.413	45.91	-0.08	0.15
11:18	8.747	45.90	-0.07	0.16
11:19	9.080	45.90	-0.07	0.16
11:19	9.413	45.90	-0.07	0.16
11:19	9.747	45.90	-0.07	0.16
11:20	10.080	45.90	-0.07	0.16
11:22	12.115	45.86	-0.03	0.20
11:24	14.115	45.92	-0.09	0.14
11:26	16.115	45.94	-0.11	0.12
11:28	18.115	45.94	-0.11	0.12
11:30	20.115	45.95	-0.12	0.11
11:32	22.115	45.97	-0.14	0.09
11:34	24.115	45.98	-0.15	0.08
11:36	26.115	45.98	-0.15	0.08
11:38	28.115	45.97	-0.14	0.09
11:40	30.115	45.96	-0.13	0.10
11:42	32.115	45.94	-0.11	0.12
11:44	34.115	45.94	-0.11	0.12
11:46	36.115	45.94	-0.11	0.12
11:48	38.115	45.97	-0.14	0.09
11:50	40.115	45.97	-0.14	0.09
11:52	42.115	46.01	-0.18	0.05
11:54	44.115	46.02	-0.19	0.04
11:56	46.115	46.03	-0.20	0.03
11:58	48.115	46.03	-0.20	0.03
12:00	50.115	46.05	-0.22	0.01
12:02	52.115	46.01	-0.18	0.05
12:04	54.115	46.00	-0.17	0.06
12:06	56.115	46.00	-0.17	0.06
12:08	58.115	46.01	-0.18	0.05
12:10	60.115	46.04	-0.21	0.02
12:12	62.102	46.06	-0.23	0.00
12:14	64.492	46.07	-0.24	0.01
12:16	66.188	46.06	-0.23	0.00
12:18	68.188	46.06	-0.23	0.00
12:20	70.188	46.07	-0.24	0.01
12:22	72.188	46.08	-0.25	0.02
12:24	74.188	46.10	-0.27	0.04
12:26	76.188	46.09	-0.26	0.03
12:28	78.188	46.09	-0.26	0.03
12:30	80.188	46.08	-0.25	0.02
12:32	82.188	46.07	-0.24	0.01
12:34	84.188	46.05	-0.22	0.01
12:36	86.188	46.05	-0.22	0.01
12:38	88.188	46.07	-0.24	0.01
12:40	90.188	46.07	-0.24	0.01
12:42	92.188	46.06	-0.23	0.00
12:44	94.188	46.07	-0.24	0.01
12:46	96.188	46.06	-0.23	0.00
12:48	98.188	46.04	-0.21	0.02
13:10	120.110	46.03	-0.20	0.03
13:30	140.110	46.00	-0.17	0.06
13:50	160.120	46.05	-0.22	0.01
14:10	180.120	46.05	-0.22	0.01
14:30	200.120	46.06	-0.23	0.00

14:50	220.120	46.02	-0.19	0.04
15:10	240.120	45.99	-0.16	0.07
15:30	260.120	45.96	-0.13	0.10
15:50	280.120	45.94	-0.11	0.12
16:10	300.120	45.89	-0.06	0.17
16:30	320.050	45.87	-0.04	0.19
16:49	340.050	45.83	0.00	0.23
17:10	360.050	45.79	0.04	0.27
17:30	380.050	45.77	0.06	0.29
17:50	400.050	45.74	0.09	0.32
18:10	420.050	45.72	0.11	0.34
18:30	440.050	45.72	0.11	0.34
18:50	460.050	45.72	0.11	0.34
19:10	480.050	45.74	0.09	0.32
19:30	500.050	45.74	0.09	0.32
19:49	520.050	45.74	0.09	0.32
20:10	540.050	45.74	0.09	0.32
20:30	560.050	45.73	0.10	0.33
20:50	580.050	45.73	0.10	0.33
21:10	600.050	45.74	0.09	0.32
21:30	620.050	45.73	0.10	0.33
21:50	640.050	45.73	0.10	0.33
22:10	660.050	45.72	0.11	0.34
22:30	680.050	45.71	0.12	0.35
22:49	700.050	45.71	0.12	0.35
23:10	720.050	45.70	0.13	0.36
23:30	740.050	45.69	0.14	0.37
23:50	760.100	45.67	0.16	0.39
00:10	780.100	45.65	0.18	0.41
00:30	800.100	45.66	0.17	0.40
00:50	820.100	45.66	0.17	0.40
01:10	840.100	45.67	0.16	0.39
01:30	860.100	45.67	0.16	0.39
01:50	880.100	45.67	0.16	0.39
02:10	900.100	45.67	0.16	0.39
02:30	920.100	45.67	0.16	0.39
02:50	940.100	45.67	0.16	0.39
03:10	960.100	45.69	0.14	0.37
03:30	980.100	45.70	0.13	0.36
03:50	1000.100	45.70	0.13	0.36
04:50	1060.300	45.71	0.12	0.35
05:50	1120.300	45.72	0.11	0.34
06:50	1180.300	45.71	0.12	0.35
07:50	1240.300	45.66	0.17	0.40
08:50	1300.300	45.72	0.11	0.34
09:50	1360.300	45.89	-0.06	0.17
10:50	1420.300	46.10	-0.27	0.04
11:50	1480.300	46.24	-0.41	0.18
12:50	1540.300	46.25	-0.42	0.19
13:50	1600.300	46.24	-0.41	0.18
14:50	1660.300	46.17	-0.34	0.11
15:50	1720.100	46.09	-0.26	0.03
16:50	1780.100	45.96	-0.13	0.10
17:50	1840.100	45.87	-0.04	0.19
18:50	1900.100	45.80	0.03	0.26
19:50	1960.100	45.70	0.13	0.36

20:50	2020.100	45.62	0.21	0.44
21:50	2080.100	45.60	0.23	0.46
22:50	2140.100	45.58	0.25	0.48
23:50	2200.100	45.58	0.25	0.48
00:50	2260.100	45.61	0.22	0.45
01:50	2320.100	45.64	0.19	0.42
02:50	2380.100	45.68	0.15	0.38
03:50	2440.100	45.70	0.13	0.36
04:50	2500.100	45.71	0.12	0.35
05:50	2560.100	45.72	0.11	0.34
06:50	2620.100	45.73	0.10	0.33
07:50	2680.100	45.75	0.08	0.31
08:50	2740.200	45.87	-0.04	0.19
09:50	2800.200	46.04	-0.21	0.02
10:50	2860.200	46.25	-0.42	0.19
11:50	2920.100	46.40	-0.57	0.34
12:50	2980.200	46.14	-0.31	0.08
13:50	3040.200	45.90	-0.07	0.16
14:50	3100.200	45.92	-0.09	0.14
15:50	3160.200	45.91	-0.08	0.15
16:50	3220.200	45.92	-0.09	0.14
17:50	3280.200	45.92	-0.09	0.14
18:50	3340.200	45.92	-0.09	0.14
19:50	3400.200	45.92	-0.09	0.14
20:50	3460.200	45.92	-0.09	0.14
21:50	3520.200	45.92	-0.09	0.14
22:50	3580.200	45.92	-0.09	0.14
23:50	3640.200	45.93	-0.10	0.13
00:50	3700.200	45.93	-0.10	0.13
01:50	3760.200	45.93	-0.10	0.13
02:50	3820.200	45.93	-0.10	0.13
03:50	3880.200	45.93	-0.10	0.13
04:50	3940.200	45.92	-0.09	0.14
05:50	4000.200	45.92	-0.09	0.14
06:50	4060.200	45.92	-0.09	0.14
07:50	4120.200	45.92	-0.09	0.14
08:50	4180.200	45.93	-0.10	0.13
09:50	4240.200	-999.99	1045.82	1046.05
10:50	4300.200	-999.99	1045.82	1046.05
11:04	4314.800	-999.99	1045.82	1046.05

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : P 10-3 INPUT 7
RADIUS: 20.220 FEET
START DATE : 07-Oct-86
START TIME : 09:00
WATER START LEVEL: 39.72 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
09:00	0.000	39.72	0.00
09:00	0.017	-99.99	139.71
09:00	0.034	-99.99	139.71
09:00	0.050	-99.99	139.71
09:00	0.067	-99.99	139.71
09:00	0.084	-99.99	139.71
09:00	0.100	-99.99	139.71
09:00	0.117	-99.99	139.71
09:00	0.134	-99.99	139.71
09:00	0.150	-99.99	139.71
09:00	0.167	-99.99	139.71
09:00	0.257	39.72	0.00
09:00	0.340	39.72	0.00
09:00	0.424	39.72	0.00
09:00	0.507	39.72	0.00
09:00	0.590	39.72	0.00
09:00	0.674	39.72	0.00
09:00	0.757	39.72	0.00
09:00	0.840	39.72	0.00
09:00	0.924	39.72	0.00
09:01	1.007	39.72	0.00
09:01	1.414	39.72	0.00
09:01	1.748	39.72	0.00
09:02	2.081	39.72	0.00
09:02	2.414	39.72	0.00
09:02	2.748	39.72	0.00
09:03	3.081	39.72	0.00
09:03	3.415	39.72	0.00
09:03	3.748	39.72	0.00
09:04	4.081	39.72	0.00
09:04	4.414	39.72	0.00
09:04	4.748	39.72	0.00
09:05	5.081	39.72	0.00
09:05	5.414	39.72	0.00
09:05	5.748	39.72	0.00
09:06	6.081	39.72	0.00
09:06	6.415	39.72	0.00
09:06	6.748	39.72	0.00
09:07	7.081	39.72	0.00
09:07	7.415	39.72	0.00
09:07	7.748	39.72	0.00

09:08	8.081	39.72	0.00
09:08	8.415	39.72	0.00
09:08	8.748	39.69	0.03
09:09	9.081	39.72	0.00
09:09	9.414	39.72	0.00
09:09	9.748	39.72	0.00
09:10	10.081	39.72	0.00
09:12	12.108	39.72	0.00
09:14	14.152	39.72	0.00
09:16	16.152	39.72	0.00
09:18	18.152	39.72	0.00
09:20	20.152	39.72	0.00
09:22	22.152	39.72	0.00
09:24	24.152	39.72	0.00
09:26	26.152	39.72	0.00
09:28	28.215	39.72	0.00
09:30	30.197	39.72	0.00
09:32	32.197	39.72	0.00
09:34	34.197	39.72	0.00
09:36	36.197	39.72	0.00
09:38	38.197	39.72	0.00
09:40	40.197	39.72	0.00
09:42	42.197	39.72	0.00
09:44	44.197	39.72	0.00
09:46	46.197	39.72	0.00
09:48	48.197	39.72	0.00
09:50	50.197	39.72	0.00
09:52	52.197	39.72	0.00
09:54	54.197	39.72	0.00
09:56	56.217	39.72	0.00
09:58	58.100	39.72	0.00
10:00	60.245	39.72	0.00
10:02	62.245	39.72	0.00
10:04	64.245	39.72	0.00
10:06	66.245	39.72	0.00
10:08	68.245	39.72	0.00
10:10	70.245	39.72	0.00
10:12	72.245	39.72	0.00
10:14	74.245	39.72	0.00
10:16	76.245	39.72	0.00
10:18	78.245	39.72	0.00
10:20	80.245	39.72	0.00
10:22	82.245	39.72	0.00
10:24	84.245	39.72	0.00
10:26	86.245	39.72	0.00
10:28	88.245	39.72	0.00
10:30	90.245	39.72	0.00
10:32	92.245	39.72	0.00
10:34	94.245	39.72	0.00
10:36	96.245	39.72	0.00
10:38	98.245	39.72	0.00
11:00	120.210	39.72	0.00
11:20	140.210	39.72	0.00
11:40	160.210	39.72	0.00
12:00	180.220	39.72	0.00
12:20	200.220	39.72	0.00

12:40	220.220	39.72	0.00
13:00	240.220	39.72	0.00
13:20	260.220	39.72	0.00
13:40	280.230	39.72	0.00
14:00	300.230	39.72	0.00
14:20	320.230	39.72	0.00
14:40	340.180	39.72	0.00
15:00	360.100	39.72	0.00
15:20	380.100	39.72	0.00
15:40	400.100	39.72	0.00
16:00	420.170	39.72	0.00
16:20	440.250	39.72	0.00
16:40	460.200	39.72	0.00
17:00	480.170	39.72	0.00
17:20	500.170	39.72	0.00
17:40	520.130	39.72	0.00
18:00	540.120	39.72	0.00
18:20	560.220	39.72	0.00
18:40	580.080	39.72	0.00
19:00	600.220	39.72	0.00
19:20	620.230	39.72	0.00
19:40	640.220	39.72	0.00
20:00	660.220	39.72	0.00
20:20	680.130	39.72	0.00
20:40	700.120	39.72	0.00
21:00	720.230	39.72	0.00
21:20	740.300	39.72	0.00
21:40	760.230	39.72	0.00
22:00	780.230	39.72	0.00
22:20	800.230	39.72	0.00
22:40	820.180	39.72	0.00
23:00	840.570	39.72	0.00
23:20	860.180	39.72	0.00
23:40	880.060	39.72	0.00
00:00	900.170	39.72	0.00
00:20	920.170	39.72	0.00
00:40	940.170	39.72	0.00
01:00	960.170	39.72	0.00
01:20	980.170	39.72	0.00
01:40	1000.200	39.72	0.00
02:40	1060.300	39.72	0.00
03:40	1120.300	39.72	0.00
04:40	1180.300	39.72	0.00
05:40	1240.300	39.72	0.00
06:40	1300.300	39.72	0.00
07:40	1360.200	39.72	0.00
08:40	1420.200	39.72	0.00
09:40	1480.200	39.72	0.00
10:40	1540.200	39.72	0.00
11:40	1600.300	39.72	0.00
12:40	1660.300	39.72	0.00
13:40	1720.200	39.72	0.00
14:40	1780.300	39.72	0.00
15:40	1840.300	39.72	0.00
16:40	1900.300	39.72	0.00
17:40	1960.200	39.71	0.01

18:40	2020.200	39.71	0.01
19:40	2080.200	39.71	0.01
20:40	2140.200	39.72	0.00
21:40	2200.300	39.71	0.01
22:40	2260.300	39.71	0.01
23:40	2320.200	39.71	0.01
00:40	2380.200	39.71	0.01
01:40	2440.200	39.71	0.01
02:40	2500.200	39.71	0.01
03:40	2560.200	39.72	0.00
04:40	2620.200	39.71	0.01
05:40	2680.200	39.71	0.01
06:40	2740.200	39.71	0.01
07:40	2800.200	39.71	0.01
08:40	2860.300	39.71	0.01
09:40	2920.300	39.71	0.01
10:40	2980.300	39.71	0.01
11:40	3040.200	39.71	0.01
12:40	3100.200	39.71	0.01
13:40	3160.300	39.71	0.01
14:40	3220.300	39.71	0.01
15:40	3280.200	39.71	0.01
16:40	3340.200	39.71	0.01
17:40	3400.300	39.71	0.01
18:40	3460.300	39.71	0.01
19:40	3520.300	39.71	0.01
20:40	3580.200	39.71	0.01
21:40	3640.200	39.71	0.01
22:40	3700.200	39.71	0.01
23:40	3760.200	39.71	0.01
00:40	3820.200	39.71	0.01
01:40	3880.200	39.71	0.01
02:40	3940.200	39.71	0.01
03:40	4000.200	39.71	0.01
04:40	4060.200	39.71	0.01
05:40	4120.200	39.71	0.01
06:40	4180.200	39.70	0.02
07:40	4240.300	39.71	0.01
08:40	4300.300	39.70	0.02
09:40	4360.700	39.71	0.01
10:40	4420.300	39.70	0.02
11:40	4480.300	39.70	0.02
12:40	4540.300	39.70	0.02
13:40	4600.300	39.70	0.02
14:40	4660.300	39.70	0.02
15:40	4720.300	39.70	0.02
16:40	4780.300	39.70	0.02
17:40	4840.300	39.70	0.02
18:40	4900.300	39.70	0.02
19:40	4960.300	39.70	0.02
20:40	5020.300	39.70	0.02
21:40	5080.300	39.70	0.02
22:40	5140.300	39.70	0.02
23:40	5200.300	39.70	0.02
00:40	5260.300	39.69	0.03
01:40	5320.300	39.70	0.02

02:40	5380.300	39.69	0.03
03:40	5440.300	39.70	0.02
04:40	5500.300	39.70	0.02
05:40	5560.300	39.69	0.03
06:40	5620.300	39.70	0.02
07:40	5680.300	39.70	0.02
08:40	5740.300	39.69	0.03
09:40	5800.300	39.70	0.02
10:40	5860.300	39.69	0.03
11:40	5920.300	39.69	0.03
12:40	5980.300	39.69	0.03
13:40	6040.300	39.69	0.03
14:40	6100.300	39.69	0.03
15:40	6160.500	39.69	0.03
16:40	6220.300	39.69	0.03
17:40	6280.300	39.69	0.03
18:40	6340.300	39.69	0.03
19:40	6400.400	39.69	0.03
20:40	6460.200	39.69	0.03
21:40	6520.200	39.69	0.03
22:40	6580.300	39.69	0.03
23:40	6640.300	39.69	0.03
00:40	6700.300	39.69	0.03
01:40	6760.300	39.69	0.03
02:40	6820.300	39.69	0.03
03:40	6880.300	39.70	0.02
04:40	6940.300	39.69	0.03
05:40	7000.300	39.69	0.03
06:40	7060.300	39.69	0.03
07:40	7120.300	39.66	0.06
08:40	7180.300	39.59	0.13
09:40	7240.300	39.58	0.14
10:40	7300.300	39.58	0.14
11:40	7360.300	39.58	0.14
12:40	7420.300	39.58	0.14
13:40	7480.300	39.58	0.14
14:40	7540.300	39.58	0.14
15:40	7600.300	39.57	0.15
16:40	7660.300	39.57	0.15
17:40	7720.300	39.57	0.15
18:40	7780.200	39.57	0.15
19:40	7840.200	39.57	0.15
20:40	7900.300	39.57	0.15
21:40	7960.300	39.57	0.15
22:40	8020.300	39.59	0.13
23:40	8080.300	39.59	0.13
00:40	8140.300	39.59	0.13
01:40	8200.300	39.59	0.13
02:40	8260.300	39.59	0.13
03:40	8320.300	39.59	0.13
04:40	8380.300	39.59	0.13
05:40	8440.300	39.59	0.13
06:40	8500.300	39.59	0.13
07:40	8560.200	39.59	0.13
08:40	8620.300	39.59	0.13
09:00	8640.600	39.58	0.14

ADJUSTED DATA

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME : REI 10-1 RUN # 2
TEST TYPE : DRAWDOWN
WELL NUMBER : P 10-3 INPUT 7
RADIUS: 20.220 FEET
START DATE : 13-Oct-86
START TIME : 10:25
WATER START LEVEL: 39.72 FEET

TIME	E.T. (MIN)	LEVEL	Delta H
10:25	8725.000	39.59	0.13
10:35	8735.071	39.59	0.13
10:45	8745.070	39.59	0.13
10:55	8755.072	39.59	0.13
11:05	8765.072	39.59	0.13
11:15	8775.072	39.59	0.13
11:25	8785.072	39.59	0.13
11:35	8795.072	39.59	0.13
11:45	8805.072	39.59	0.13
11:55	8815.102	39.59	0.13
12:05	8825.090	39.59	0.13
12:15	8835.090	39.59	0.13
12:25	8845.090	39.59	0.13
12:35	8855.090	39.59	0.13
12:45	8865.090	39.59	0.13
12:55	8875.120	39.59	0.13
13:04	8884.970	39.59	0.13
13:14	8894.970	39.59	0.13
13:25	8904.970	39.59	0.13
13:34	8914.970	39.59	0.13
13:45	8924.970	39.59	0.13
13:54	8934.970	39.59	0.13
14:05	8944.970	39.59	0.13
14:14	8955.020	39.59	0.13
14:25	8965.080	39.59	0.13
14:35	8975.080	39.59	0.13
14:45	8985.080	39.59	0.13
14:55	8995.080	39.59	0.13
15:05	9005.080	39.59	0.13
15:15	9015.080	39.59	0.13
15:25	9025.080	39.59	0.13
15:35	9035.080	39.59	0.13
15:45	9045.080	39.59	0.13
15:55	9055.080	39.59	0.13
16:04	9065.020	39.59	0.13
16:15	9075.020	39.58	0.14
16:25	9084.970	39.59	0.13
16:35	9095.080	39.59	0.13
16:45	9105.080	39.58	0.14
16:55	9115.080	39.59	0.13

ADJUSTED DATA

17:05	9125.080	39.59	0.13
17:15	9135.080	39.59	0.13
17:25	9145.080	39.59	0.13
17:35	9155.080	39.59	0.13
17:45	9165.080	39.58	0.14
17:55	9175.080	39.58	0.14
18:05	9185.080	39.58	0.14
18:15	9195.080	39.58	0.14
18:25	9205.080	39.59	0.13
18:35	9215.080	39.59	0.13
18:45	9225.080	39.58	0.14
18:55	9235.080	39.58	0.14
19:05	9245.080	39.58	0.14
19:15	9255.080	39.58	0.14
19:25	9265.080	39.58	0.14
19:35	9275.070	39.59	0.13
19:45	9285.080	39.59	0.13
19:55	9295.080	39.58	0.14
20:05	9305.080	39.58	0.14
20:15	9315.080	39.58	0.14
20:25	9325.080	39.59	0.13
20:35	9335.080	39.59	0.13
20:45	9345.080	39.58	0.14
20:55	9355.080	39.58	0.14
21:05	9365.080	39.58	0.14
21:15	9375.080	39.58	0.14
21:25	9385.080	39.58	0.14
21:35	9395.080	39.58	0.14
21:45	9405.080	39.58	0.14
21:55	9415.080	39.58	0.14
22:05	9425.080	39.58	0.14
22:15	9435.080	39.58	0.14
22:25	9445.080	39.58	0.14
22:35	9455.080	39.58	0.14
22:45	9465.080	39.58	0.14
22:54	9475.020	39.58	0.14
23:05	9485.020	39.58	0.14
23:14	9495.020	39.58	0.14
23:25	9505.020	39.58	0.14
23:34	9515.020	39.58	0.14
23:45	9525.020	39.58	0.14
23:55	9535.020	39.58	0.14
00:05	9545.020	39.58	0.14
00:15	9555.020	39.58	0.14
00:25	9565.030	39.58	0.14
00:35	9575.030	39.58	0.14
00:44	9585.030	39.58	0.14
00:55	9595.030	39.58	0.14
01:04	9605.030	39.58	0.14
01:15	9615.030	39.58	0.14
01:25	9625.030	39.58	0.14
01:35	9635.030	39.58	0.14
01:45	9645.030	39.58	0.14
01:55	9655.030	39.58	0.14
02:05	9665.030	39.58	0.14
02:14	9675.030	39.58	0.14

ADJUSTED DATA

02:25	9685.030	39.58	0.14
02:34	9695.030	39.58	0.14
02:45	9705.030	39.58	0.14
02:55	9715.030	39.58	0.14
03:04	9725.000	39.58	0.14
03:15	9735.000	39.58	0.14
03:24	9745.000	39.58	0.14
03:35	9755.100	39.58	0.14
03:44	9765.000	39.58	0.14
03:55	9775.000	39.58	0.14
04:04	9785.000	39.58	0.14
04:15	9795.000	39.58	0.14
04:25	9805.000	39.58	0.14
04:34	9815.000	39.58	0.14
04:45	9825.000	39.58	0.14
04:54	9835.000	39.57	0.15
05:05	9845.000	39.58	0.14
05:14	9855.000	39.58	0.14
05:25	9865.000	39.58	0.14
05:34	9875.000	39.58	0.14
05:45	9885.000	39.58	0.14
05:55	9895.000	39.58	0.14
06:04	9905.000	39.58	0.14
06:15	9915.000	39.58	0.14
06:24	9925.000	39.58	0.14
06:35	9935.000	39.58	0.14
06:44	9945.000	39.58	0.14
06:55	9955.000	39.58	0.14
07:05	9965.100	39.58	0.14
07:15	9975.100	39.58	0.14
07:25	9985.100	39.57	0.15
07:35	9995.100	39.57	0.15
07:45	10005.100	39.58	0.14
07:55	10015.100	39.58	0.14
08:05	10025.100	39.58	0.14
08:15	10035.100	39.57	0.15
08:25	10045.100	39.58	0.14
08:35	10055.100	39.58	0.14
08:45	10065.100	39.58	0.14
08:55	10075.000	39.57	0.15
09:04	10085.000	39.58	0.14
09:15	10095.000	39.58	0.14
09:24	10105.000	39.58	0.14
09:28	10108.200	39.57	0.15

PROJECT NAME : FRENCH LTD.
PROJECT NUMBER : 275-14
TEST NAME: REI 10-1 RUN # 2
TEST TYPE: RECOVERY
WELL NUMBER: P 10-3 INPUT 7
RADIUS: 20.220 FEET
START DATE: 07-Oct-86
START TIME: 11:10
WATER START LEVEL: 39.72 FEET
WATER STOP LEVEL: 39.65 FEET
TOTAL PUMPING TIME: 10210.6 MIN

TIME	E.T. (MIN)	LEVEL	Delta H (REC)	Delta H (RES)
11:10	0.017	-999.99	1039.64	1039.71
11:10	0.034	-999.99	1039.64	1039.71
11:10	0.050	-999.99	1039.64	1039.71
11:10	0.067	-999.99	1039.64	1039.71
11:10	0.084	-999.99	1039.64	1039.71
11:10	0.100	-999.99	1039.64	1039.71
11:10	0.117	-999.99	1039.64	1039.71
11:10	0.134	-999.99	1039.64	1039.71
11:10	0.150	-999.99	1039.64	1039.71
11:10	0.167	-999.99	1039.64	1039.71
11:10	0.257	39.65	0.00	0.07
11:10	0.341	39.65	0.00	0.07
11:10	0.424	39.65	0.00	0.07
11:10	0.507	39.65	0.00	0.07
11:10	0.591	39.65	0.00	0.07
11:10	0.674	39.65	0.00	0.07
11:10	0.757	39.65	0.00	0.07
11:10	0.841	39.65	0.00	0.07
11:10	0.924	39.65	0.00	0.07
11:11	1.007	39.65	0.00	0.07
11:11	1.413	39.65	0.00	0.07
11:11	1.747	39.65	0.00	0.07
11:12	2.080	39.65	0.00	0.07
11:12	2.413	39.65	0.00	0.07
11:12	2.747	39.65	0.00	0.07
11:13	3.080	39.65	0.00	0.07
11:13	3.413	39.65	0.00	0.07
11:13	3.747	39.65	0.00	0.07
11:14	4.080	39.65	0.00	0.07
11:14	4.413	39.65	0.00	0.07
11:14	4.747	39.65	0.00	0.07
11:15	5.080	39.65	0.00	0.07
11:15	5.413	39.65	0.00	0.07
11:15	5.747	39.65	0.00	0.07
11:16	6.080	39.65	0.00	0.07
11:16	6.413	39.65	0.00	0.07
11:16	6.747	39.65	0.00	0.07
11:17	7.080	39.65	0.00	0.07
11:17	7.413	39.65	0.00	0.07
11:17	7.747	39.65	0.00	0.07

11:18	8.080	39.65	0.00	0.07
11:18	8.413	39.65	0.00	0.07
11:18	8.747	39.65	0.00	0.07
11:19	9.080	39.65	0.00	0.07
11:19	9.413	39.65	0.00	0.07
11:19	9.747	39.65	0.00	0.07
11:20	10.080	39.65	0.00	0.07
11:22	12.115	39.65	0.00	0.07
11:24	14.115	39.65	0.00	0.07
11:26	16.115	39.65	0.00	0.07
11:28	18.115	39.65	0.00	0.07
11:30	20.115	39.65	0.00	0.07
11:32	22.115	39.65	0.00	0.07
11:34	24.115	39.65	0.00	0.07
11:36	26.115	39.65	0.00	0.07
11:38	28.115	39.65	0.00	0.07
11:40	30.115	39.65	0.00	0.07
11:42	32.115	39.65	0.00	0.07
11:44	34.115	39.65	0.00	0.07
11:46	36.115	39.65	0.00	0.07
11:48	38.115	39.65	0.00	0.07
11:50	40.115	39.65	0.00	0.07
11:52	42.115	39.65	0.00	0.07
11:54	44.115	39.65	0.00	0.07
11:56	46.115	39.65	0.00	0.07
11:58	48.115	39.65	0.00	0.07
12:00	50.115	39.65	0.00	0.07
12:02	52.115	39.65	0.00	0.07
12:04	54.115	39.65	0.00	0.07
12:06	56.115	39.65	0.00	0.07
12:08	58.115	39.65	0.00	0.07
12:10	60.115	39.65	0.00	0.07
12:12	62.102	39.65	0.00	0.07
12:14	64.492	39.65	0.00	0.07
12:16	66.188	39.65	0.00	0.07
12:18	68.188	39.65	0.00	0.07
12:20	70.188	39.65	0.00	0.07
12:22	72.188	39.65	0.00	0.07
12:24	74.188	39.65	0.00	0.07
12:26	76.188	39.65	0.00	0.07
12:28	78.188	39.65	0.00	0.07
12:30	80.188	39.65	0.00	0.07
12:32	82.188	39.65	0.00	0.07
12:34	84.188	39.64	0.01	0.08
12:36	86.188	39.65	0.00	0.07
12:38	88.188	39.65	0.00	0.07
12:40	90.188	39.65	0.00	0.07
12:42	92.188	39.65	0.00	0.07
12:44	94.188	39.65	0.00	0.07
12:46	96.188	39.65	0.00	0.07
12:48	98.188	39.65	0.00	0.07
13:10	120.110	39.65	0.00	0.07
13:30	140.110	39.65	0.00	0.07
13:50	160.120	39.65	0.00	0.07
14:10	180.120	39.65	0.00	0.07
14:30	200.120	39.64	0.01	0.08

14:50	220.120	39.65	0.00	0.07
15:10	240.120	39.65	0.00	0.07
15:30	260.120	39.65	0.00	0.07
15:50	280.120	39.65	0.00	0.07
16:10	300.120	39.65	0.00	0.07
16:30	320.050	39.65	0.00	0.07
16:49	340.050	39.64	0.01	0.08
17:10	360.050	39.64	0.01	0.08
17:30	380.050	39.65	0.00	0.07
17:50	400.050	39.64	0.01	0.08
18:10	420.050	39.65	0.00	0.07
18:30	440.050	39.64	0.01	0.08
18:50	460.050	39.64	0.01	0.08
19:10	480.050	39.64	0.01	0.08
19:30	500.050	39.65	0.00	0.07
19:49	520.050	39.65	0.00	0.07
20:10	540.050	39.64	0.01	0.08
20:30	560.050	39.64	0.01	0.08
20:50	580.050	39.64	0.01	0.08
21:10	600.050	39.65	0.00	0.07
21:30	620.050	39.65	0.00	0.07
21:50	640.050	39.64	0.01	0.08
22:10	660.050	39.65	0.00	0.07
22:30	680.050	39.65	0.00	0.07
22:49	700.050	39.65	0.00	0.07
23:10	720.050	39.65	0.00	0.07
23:30	740.050	39.64	0.01	0.08
23:50	760.100	39.64	0.01	0.08
00:10	780.100	39.65	0.00	0.07
00:30	800.100	39.64	0.01	0.08
00:50	820.100	39.65	0.00	0.07
01:10	840.100	39.65	0.00	0.07
01:30	860.100	39.65	0.00	0.07
01:50	880.100	39.65	0.00	0.07
02:10	900.100	39.65	0.00	0.07
02:30	920.100	39.64	0.01	0.08
02:50	940.100	39.65	0.00	0.07
03:10	960.100	39.65	0.00	0.07
03:30	980.100	39.64	0.01	0.08
03:50	1000.100	39.64	0.01	0.08
04:50	1060.300	39.64	0.01	0.08
05:50	1120.300	39.64	0.01	0.08
06:50	1180.300	39.64	0.01	0.08
07:50	1240.300	39.65	0.00	0.07
08:50	1300.300	39.64	0.01	0.08
09:50	1360.300	39.64	0.01	0.08
10:50	1420.300	39.65	0.00	0.07
11:50	1480.300	39.64	0.01	0.08
12:50	1540.300	39.65	0.00	0.07
13:50	1600.300	39.64	0.01	0.08
14:50	1660.300	39.64	0.01	0.08
15:50	1720.100	39.65	0.00	0.07
16:50	1780.100	39.64	0.01	0.08
17:50	1840.100	39.64	0.01	0.08
18:50	1900.100	39.64	0.01	0.08
19:50	1960.100	39.64	0.01	0.08

20:50	2020.100	39.64	0.01	0.08
21:50	2080.100	39.64	0.01	0.08
22:50	2140.100	39.64	0.01	0.08
23:50	2200.100	39.64	0.01	0.08
00:50	2260.100	39.64	0.01	0.08
01:50	2320.100	39.64	0.01	0.08
02:50	2380.100	39.64	0.01	0.08
03:50	2440.100	39.64	0.01	0.08
04:50	2500.100	39.64	0.01	0.08
05:50	2560.100	39.64	0.01	0.08
06:50	2620.100	39.64	0.01	0.08
07:50	2680.100	39.64	0.01	0.08
08:50	2740.200	39.64	0.01	0.08
09:50	2800.200	39.64	0.01	0.08
10:50	2860.200	39.64	0.01	0.08
11:50	2920.100	39.64	0.01	0.08
12:50	2980.200	39.64	0.01	0.08
13:50	3040.200	39.64	0.01	0.08
14:50	3100.200	39.64	0.01	0.08
15:50	3160.200	39.64	0.01	0.08
16:50	3220.200	39.64	0.01	0.08
17:50	3280.200	39.64	0.01	0.08
18:50	3340.200	39.64	0.01	0.08
19:50	3400.200	39.64	0.01	0.08
20:50	3460.200	39.63	0.02	0.09
21:50	3520.200	39.64	0.01	0.08
22:50	3580.200	39.64	0.01	0.08
23:50	3640.200	39.64	0.01	0.08
00:50	3700.200	39.64	0.01	0.08
01:50	3760.200	39.63	0.02	0.09
02:50	3820.200	39.64	0.01	0.08
03:50	3880.200	39.64	0.01	0.08
04:50	3940.200	39.64	0.01	0.08
05:50	4000.200	39.63	0.02	0.09
06:50	4060.200	39.63	0.02	0.09
07:50	4120.200	39.63	0.02	0.09
08:50	4180.200	39.64	0.01	0.08
09:50	4240.200	-999.99	1039.64	1039.71
10:50	4300.200	-999.99	1039.64	1039.71
11:04	4314.800	-999.99	1039.64	1039.71

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ______
DATE: 10-7-86

WELL NUMBER: STAFF GAUGE
r IN FEET: ______
STARTING WATER LEVEL: ______

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r2
1529		74.42			
17.06		74.41 AB ~~109.50~~			
2330		74.42			
10/8 0038		74.42	SC		
0919		74.410 DRG	DRG		
11:11		74.415	DRG		
1313		~~74.4[illegible]~~ D.D	DD	During rain event. D.D	
		74.44 DD			
[illegible]		[illegible]			
17:00		74.51	AB.		
1945		74.52	MC		
10-9-86 0112		74.51	SC		
8:33		74.51	DWD		
1115		74.51	DWD		
1315		74.51	DWD		
15:27		74.51	AB		

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRGICH LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: STAFF GUAGE
r IN FEET:
STARTING WATER LEVEL:
~~449-0575~~

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/9/86	17:30		74.52	AB.		
	21:30		74.52	A.B.		
	23:35		74.52	A.T.		
10/10/86	01:26		74.52	A.T		
	03:45		74.52	A.T		
	09:02		74.51	DWD		
	11:12		74.51	DRG		
	13:14		74.51	DWD		
	15:21		74.51	J.d.		
	17:34		74.51	A.B		
	17:58		74.51	J.d.		
	19:00		74.51	J.G.		
	22:01		74.51	J.G		
10-11	00:05		74.51	A.T.		
	01:15		74.51	A.T.		
	03:10		74.51	A.T.		
	04:03		74.51	A.T.		
	11:10		74.51	DRG		
	13:10		74.515	DRG		
	1756		74.53	DD		
	2000		74.56	MC		

REI

CALCULATIONS AND COMPUTATIONS

SHEET___ OF___

PROJECT: ______ JOB NO.: ______

SUBJECT: ~~FLOW RATE MONITORING SHEET~~ Staff Guage water

COMPUTED BY:____ DATE:____

CHECKED BY:____ DATE:____

	~~FLOW RATE~~ Level	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
10/11/86	74.54	2000	DD			
	74.55	2334	MC			
	74.55	02:01	A.T			
	74.55	03:45	A.T.			
10-12-86	74.60	830	DWD			
	74.73	1337	DWD			
	74.76	1712	MC			
	74.76	2320	MC			
10-13-86	74.78	0732	pcm			
	74.825	1418	DRG			
10-13-86	74.83	2300	MC			
10-14-86	74.825	03.59	J.G.			
	74.825	07:28	JG			
	74.835	10:12	DWD			
10-15-86	74.82	10:09	DRG			

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ____

PROJECT: ____________ JOB NO.: ____________

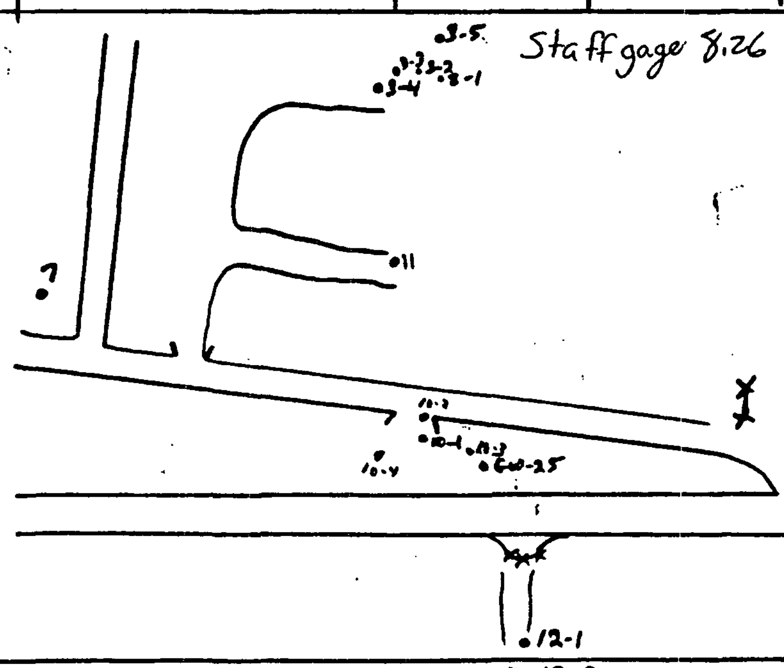
SUBJECT: FRENCH LTD WELLS COMPUTED BY: ____ DATE: ____

Initial water levels 10-7-86 CHECKED BY: ____ DATE: ____

MW #	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11	2	J.G.	8:10	78.42 ✓	
3-1					
3-2					
3-3					
3-4	4	J.G	8:15	80.79 ✓	
3-5			8:18		
7	5	J.G.	8:04 A	80.33 ✓	
10-1	1	J.G	7:52	81.34 ✓	
10-2	9	J.G	7:56	5.78 ✓	
10-3	10	J.G	7:45	7.14 ✓	
10-4	11	J.G	7:58	7.66 ✓	
GW-25					
P10-2	6	~~J.G~~	~~7:46~~	~~46.06~~ ✓	____
P10-3	7	~~J.G~~	~~7:47~~	~~39.72~~ ✓	____
P10-4	8	~~J.G.~~	~~7:50~~	~~38.82~~ ✓	____
12-1					
12-2					

Staff gage 8.26 74.42 9.2.

ceep



CALCULATIONS AND COMPUTATIONS

SHEET 3 OF ____

PROJECT: ____ JOB NO.: ____

SUBJECT: FRENCH LTD WELLS

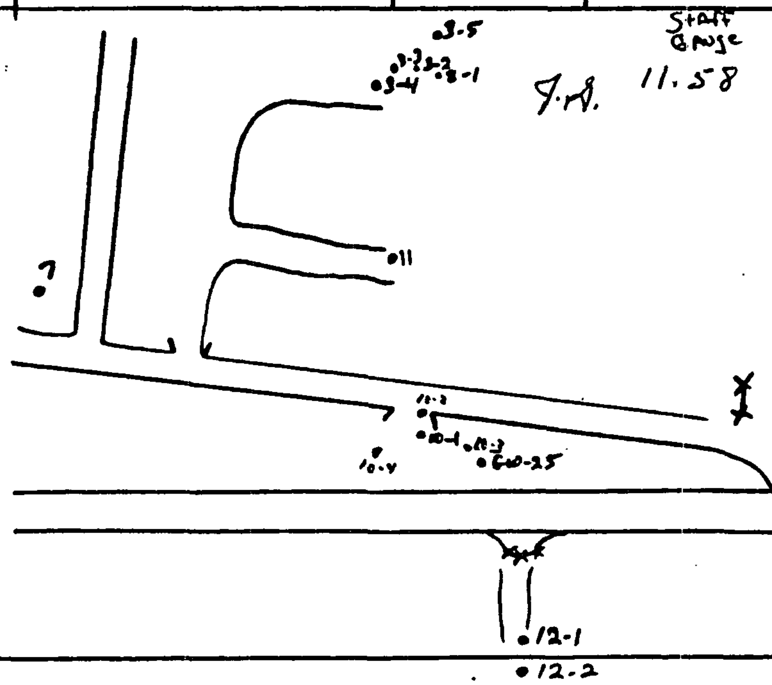
COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

10-7-86

MW#	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11		J.A.	11:08	~~[illegible]~~	79.72
3-1					
3-2					
3-3					
3-4		J.A.	11:14	81.44	
3-5					
7		J.A.	11:03	80.35	
10-1					
10-2		J.A.	10:53	5.79	
10-3		J.A.	10.49	7.14	
10-4		J.A.	10:58	7.67	
GW-25					
P10-2		~~J.A.~~	~~10:56~~	~~45.98~~	—
P10-3		~~J.A.~~	~~10:51~~	~~39.72~~	—
P10-4		~~J.A.~~	~~10:54~~	~~38.82~~	—
12-1		J.A.	11.22	77.66	
12-2					

Staff Gauge J.A. 11.58 74.42 (reef?)



REI

CALCULATIONS AND COMPUTATIONS

SHEET 4 OF ____

PROJECT: ____ JOB NO.: ____

SUBJECT: FRENCH LTD WELLS

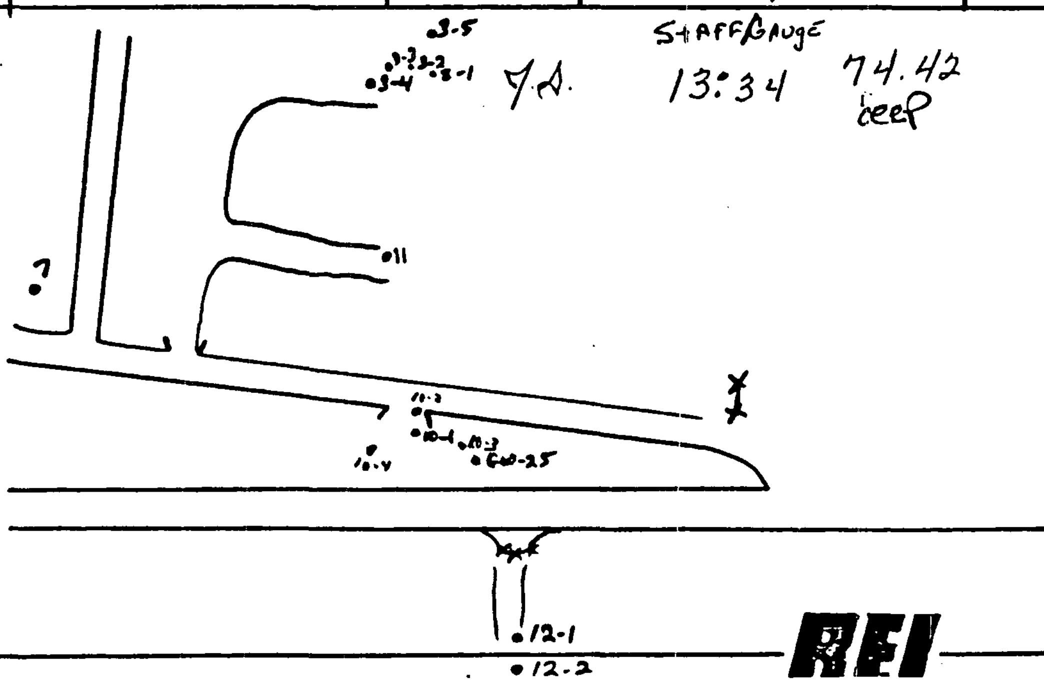
COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

10-7-86

MW #	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11		Y.A.	13:06	80.66	
3-1					
3-2					
3-3					
3-4		Y.A.	13:09	82.24	
3-5					
7		Y.A.	13:03	80.35	
10-1		Y.A.	14:03 13:37	111.49 111:42	
10-2		Y.A.	12:55	5.77	
10-3		Y.A.	12:51	7.13	
10-4		Y.A.	13:00	7.64	
GW-25					
P10-2		~~Y.A.~~	~~12:58~~	~~45.97~~	~~——~~
P10-3		~~Y.A.~~	~~12.54~~	~~39.72~~	~~——~~
P10-4		~~Y.A.~~	~~12.57~~	~~38.82~~	~~——~~
12-1		Y.A.	13:16	77.81	
12-2					

STAFF GAUGE Y.A. 13:34 74.42 ceeP



REI

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF ____

PROJECT: ____________________ JOB NO.: ____________

SUBJECT: FRENCH LTD WELLS

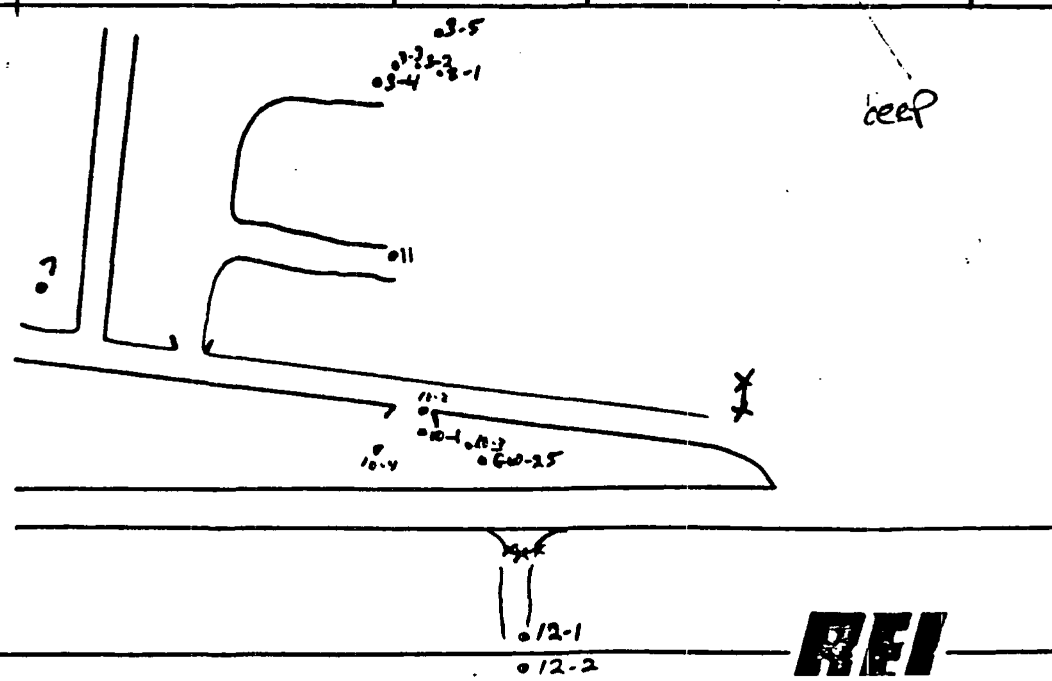
COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

10-7-86

MW #	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11					
3-1					
3-2					
3-3					
3-4					
3-5					
7					
10-1					
10-2		J.A.	9:10	5.29	
10-3		J.A.	9:07	7.14	
10-4		J.A.	9:15	7.65	
GW-25					
P10-2		J.A.	9:14	45.98	—
P10-3		J.A.	9:08	37.12	—
P10-4		J.A.	9:12	38.82	—
12-1		J.A.	9:29	77.64	
12-2					

deep



REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: P-10-2
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10-7-86	1502		45.98			
	17:13		46.01			
	19:07		45.98			
	2127		45.97			
	23:02		45.98			
	00:45		45.96	SC		
	3:04		45.96	SC		
	4:56		45.96	SC		
	0704		45.96	A.T		
	914		45.945	DRG		
10-8-86	1106		45.95	DRG		
	1309		45.925	DRG		
	1310	check oi	45.925	DRG		
	1510		45.91	A.B.		
	17:06		45.88	AB.		
	1919		45.86	RC		
	20:59		45.85	AB		
	23:05		45.87	MC		
10-9-86	01:05		45.84	S.C.		
	03:27		45.83	S.C		
	05:05		45.84	S.C		
	06:51		45.83	S.C		
	7:04		45.86	D.W.D		
	11:10		45.87	D.W.D		
	13:11		45.85	D.W.D		
	15:25		4587	AB.		

REI

PUMP TEST DATA SHEET FOR ____ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: ~~[illegible]~~ P-10-2
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	16:58		45.86	AB		
	1917		45.86	HC		
10/9/86	21:03		45.86	AB		
	23:19		45.88	JB		
	01:09		45.85	JB		
10/10/86	03:12		45.85	AT		
	05:00		45.87	AT		
	07:03		45.855	AT		
	909		45.86	DRG		
	11:07		45.855	DRG		
	13:24		45.855	DRG		
	15:15		45.86	J.A.		
	17:06		45.88	AP		
	19:05		45.86	J.A.		
	21:03		45.89	AB		
	23:10		45.88	J.G.		
10/11/86	01:06		45.87	J.B.		
	03:08		45.88	A.T.		
	05:13		45.88	J.B.		
	06:59		45.89	A.T.		
	9:07		45.87	AB		
	11:05		45.86	DRG		
	13:05		45.855	DRG		
	15:24		45.95	AB		
	1705		45.94	[illegible]		
	19:12		45.04	MV		

FEI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French Ltd
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: P-10.2
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/11/86	2112		45.92	DD		
	2303		45.98	MC		
	01:28		45.92	AT		
	03:19		45.93	S.B.		
	05:13		45.92	AT		
	07:00		45.94	AT		
	1:01		45.83	JG	← cap	off in rain
10-12-86	1104		45.74	JG		
	1304		45.63	J.G		
	15:[illegible]		45.53	JG		
	1704		45.48	MG		
	1916		45.44	MC		
	21:01		45.48	AB		
	23:08		45.50	MC		
10-13-86	1:08		45.54	JB		
	3:02		45.56	AC		
	5:08		45.59	AC		
	7:00		45.62	HC.		
	09:06		45.66	DRG		
	13:09		45.61	DRG		
	15:03		45.595	DRG		
	1929		45.62	SC		
	2310		45.65	SC		
10/14	03:22		45.71	J.G.		
	06:52		45.73	S.C.		
	07:31		45.75	J.G.		
	10:02		45.78	DRG		
	11:22		45.855	DRG - double checked		
	11 58		45.91	DWD		
	1320		45.895	DWD		

FEI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ____________
DATE: 10-14-86

WELL NUMBER: P-10-2
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10-14-86	15:21		45.93	AB				
	19:10		45.94	AB				
	23:12		45.96	SC				
	07:52		45.98	DRG				
10-15-86	13:58		46.015	DRG				
	15:06		46.015	DRG				
	23:04		46.03	SC				
10-16-86	7:01		46.05	SC				
	15:02		46.09	AB				
	23:10		46.07	SC				
10-17-86	6:50		46.07	SC				
	AB ~~2~~3:55		46.11	AB				

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: #7
r IN FEET:
STARTING WATER LEVEL:

10-7-86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
1508		80.37			
17:38		80.43			
19:20		80.47			
2153		80.51			
2317		80.57			
00:55		80.61	SC		
3:10		80.67	SC		
5:04		80.71	SC		
7:12		80.77	A.T		
9:32		80.82	DRG		
11:21		80.875	DRG		
13:26		80.90	DRG		
15:22		80.93	A.B.		
17:16		80.95	A.B		
1940		80.97	MC		
21:10		81.10	AD		
23:14		81.08	MC		
01:15		81.14	SC		
03:39		81.19	SC		
05:13		81.23	SC		
0653		81.27	SC		
929		81.33	DWD		
1125		81.37	DWD		
13:23		81.41	D.W.D		
15:39		81.46	AB		

10-8-86

10-9-86

FEI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: # 7
r IN FEET:
STARTING WATER LEVEL:

10/9/86

10/10/86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
17:14		81.50	A.B.		
1955		81.53	MC		
21:16		81.60	A.B		
23:32		81.64	JB		
03:25		81.68	A-T		
07:10		81.77	AT		
0922		81.805	DRG		
11:20		81.84	DRG		
13:38		81.875	DRG		
15:26		81.91	J.A		
17.16		81.95	A.B		
19:14		81.98	J.A.		
21:12		~~81.99~~ AB 82.01	AB		
23:22		82.04	J.G.		
03:20		82.08	A-T		
07:06		82.17	J.B.		
9:18		82.20	A.B.		
11:18		82.23	DRG		
13:17		82.24	DRG		
15:13		82.37	AB		
1723		82.36	DD		
1920		82.38	MC		

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French Ltd. WELL NUMBER: 7
PROJECT NUMBER: ________ r IN FEET: ________
DATE: 10/11/86 STARTING WATER LEVEL: ________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/11/86	2133		82.41	DD		
	2119		82.44	MC		
10-12-86	01:37		82.47	A.T.		
	03:33		82.46	A.T.		
	05:25		82.52	S.B		
	07:19		82:53	JG.		
	09:14		82:43	J.G.		
	11:17		82:32	J.G.		
	13:13		82.30	J.G.		
	15:19		82.35	JG		
	17:21		82.42	AB		
	23:30		82.75	MC		
10-13-86	07:03		82.66	JB		
	14:31		82.68	DRG		
	19:37		82.74	SC		
	23:21		82.80	J.G.		
10/14/86	03.35		82.85	J.G.		
	07.03		82.88	J.G.		
	09:40		82.91	DRG		

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ____________
DATE: 10-4-86

WELL NUMBER: 7
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r²	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:34		82.95	AB				
	23:23		82.86	SC				
	07:33		82.705	DRG				
10/15/86	13:07		82.60	A.T.				
	15:14		82.57	DRG				
	23:13		82.42	SC				
10/16/86	07:12		82.30	SC				
	15:10		82.17	A.B.				
	23:19		82.05	S.C				
/17/86	7:01		81.94	SC				
	14:07		81.86	AB				

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: P-10-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10-7-86	1501		38.82			
	17:10		38.82			
	19:05		38.84			
	2123		38.84			
	23:01		38.83			
	02:44		38.82	SC		
	3:02		38.82	SC		
	4:54		38.81	SC		
	07:03		38.82	A.T		
	0912		38.83	DRG		
10-8-86	1104		38.82	DRG		
	[illegible]		38.83	DRG		
	1309		38.83	L.B.		
	17:04		38.83	A.B		
	1916		38.82	MC		
	20:58		38.82	AB		
	23:04		38.82	MC		
10-9-86	01:04		38.81	S.C		
	03:26		38.80	SC		
	05:01		38.81	S.C.		
	06:50		38.82	S.C		
	900		38.81	D.W.D		
	1108		38.81	DWD		
	13:10		38.825	D.W.D		
	15:23		38.82	A.B		

FEI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: P-10-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	16:57		38.81	AB.		
HC	~~1922~~		~~39.71~~	~~HC~~		
10/9/86	1925		38.81	HC		
	21:00		38.81	AB		
	23:18		38.81	JB		
	01:06		38.79	JB		
10/10/86	03:11		38.81	AT		
	04:58		38.82	AT		
	07:01		38.80	AT		
	0907		38.82	DRG		
	11:06		38.805	DRG		
	13:23		38.81	DRG		
	15:14		38.80	[illegible]		
	17:03		38.81	AB		
	18:04		38.80	[illegible]		
	21:02		38.80	AB		
	23:06		38.79	JG.		
10/11	01:05		38.81	J.B		
	03:08		38.88	A.T.		
	05:11		38.82	J.B		
	06:58		38.80	A.T.		
	9:06		38.80	A.B		
	11:04		38.805	DRG		
	13:03		38.805	DRG		
	15:03		38.88	AB		
	1703		38.88	DD		
	11:[illegible]		38.88	HC		

FEI

PUMP TEST DATA SHEET FOR ____________ SHEET____

PROJECT NAME: French Ltd. WELL NUMBER: P-10-4
PROJECT NUMBER: r IN FEET:
DATE: 10/11/86 STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	2111		38.86	[illegible]		
	2301		38.86	MC		
	01:27		38.85	AT		
	03:18		38.88	A.T		
	05:12		38.86	A.T		
	07:00		38.85	AT		
	[illegible]		38.84	[illegible]		
10-12-86	[illegible]		[illegible]			
	11:05		38.85	JG		
	1303		38.84	J.G		
	15:08		38.82	JG		
	1701		38.84	MC		
	1913		38.83	MC		
	21:00		38.82	AB		
	23 07		38.80	MC		
10-13-86	1:07		38.83	JB		
	3:00		38.80	AC		
	5:07		38.80	AC		
	6:59		38.80	AC		
	9:04		38.805	DRG		
	13:08		38.80	DRG		
	15 02		38.795	DRG		
	1927		38.76	SC		
	23:09		38.77	SC		
10/14	03 21		38.74	J.G		
	06:51		38.75	J.G.		
	07:31		38.76	J.G.		
	10:00		38.76	DRG		
	11:20		38.76	DRG		

FEI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: P-10-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10-14-86	15:19		38.75'	AB				
	19:08		38.75	AB				
	23:10		38.75	SC				
	07:51		38.75	DRG				
10-15-86	13:57		38.75	DRG				
	15:05		38.755	DRG				
	23:03		38.74	SC				
	7:00		38.74	SC				
10-16-86	15:01		38.75	AB				
	23:08		38.75	S.C				
10-17-86	6:49		38.75	SC				
	AB 13:53		38.75	AB				

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10/7/86

WELL NUMBER: P-10-3
r IN FEET:
STARTING WATER LEVEL:

10-7-86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
1457		39.72			
1702		39.74			
19:03		39.73			
2108		39.74			
23:04		39.74			
00:46		39.72	SC		
3:05		39.73	SC		
4:59		39.73	SC		
07:05		39.73	AT		
9:15		39.72	DRG		
1107		39.73	DRG		
1312		39.725	DRG		
1511		39.74	A.B.		
17:08		39.73	A.B		
2000		39.73	MC		
21:01		39.74	AB		
23:06		39.72	MC		
01:06		39.72	S.C		
03:27		39.725	SC		
05:05		39.72	S.C.		
06:53		39.72	S.C		
905		39.73	D.W.D		
1111		39.73	D.W.D		
13:12		39.725	D.W.D		
15:27		39.74	AB		

10-8-86

10-9-86

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER: ________
DATE: 10-9-86

WELL NUMBER P-10-3
r IN FEET: ________
STARTING WATER LEVEL: ________

Date	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	17:03		39.72	A.B		
	1922		39.71	H C		
10/9/86	21:05		39.74	AB.		
	23:21		39.73	JB		
	01:10		39.72	JB		
10/10/86	03:14		39.72	AT		
	0500		39.72	AT		
	07:04		39.72	AT		
	0910		39.71	DRG		
	11:09		39.71	DRG		
	13:26		39.72	DRG		
	15:09		39.71	[illegible]		
	17:07		39.72	AB		
	19:06		39.71	[illegible]		
	21:05		39.74	AB		
	23:11		39.71	J.G		
10/11/86	01:07		39.72	J.B.		
	03:11		39.71	A.T.		
	05:14		39.72	J.B		
	07:00		39.71	J.B		
	9:09		39.72	A.B		
	11:07		39.70	DRG		
	13:06		39.705	DRG		
	15:05		39.81	A.B		
	1708		39.73	DD		
	[illegible]		39.77	MC		

FEI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French Ltd.
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: P-10-3
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/11/86	2115		39.77	DW		
	2257		39.77	MC		
	01:29		39.76	A.T.		
	03:20		39.77	J.B.		
	05:15		39.75	A.T.		
	07:02		39.75	A.T.		
10-12-86	909	39.68	39.68	J.G	← cap off in rain	
	1108		39.67	J.G		
	1305		39.67	J.G		
	1511		39.67	JG		
	1659		39.68	MC		
	1911		39.67	MC		
	21:02		39.68	AB		
	23:09		39.66	MC.		
10-13-86	01:10		39.67	JB		
	3:03		39.66	MC		
	5:09		39.67	MC		
	7:02		39.67	MC		
	09:08		39.675	DRG		
	13:12		39.675	DRG		
	15:04		39.66	DRG		
	1930		39.65	SC		
	2311		39.65	SC		
10/14	03:24		39.64	J.G.		
	06:53		39.64	J.G.		
	07:32		39.65	J.G.		
	10:03		39.645	DRG		
	11:23		39.64	DRG		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: P-10-3
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10-14-86	15:22		39.65	A.B				
	19:11		39.67	AB				
	23:14		39.64	SC				
	07:53		39.65	DRG				
10-15-86	14:00		39.64	DRG				
	15:07		39.65	DRG				
	23:05		39.54	S.C				
10-16-86	7:02		39.63	SC				
	15:03		39.64	AB				
	23:11		39.64	S.C				
10-17-86	6:52		39.63	SC				
	13:56		39.63	AB				

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD WELL NUMBER: 10-4
PROJECT NUMBER: ____________ r IN FEET: ____________
DATE: 10-7-86 STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10-7-86	1504		7.60			
	17:15		7.58			
	19:08		7.60			
	2130		7.62			
	23:06		7.63			
	00:50		7.61	SC		
	3:07		7.57	SC		
	5:01		7.56	Sc		
	7:07		7.56	A.T		
10-8-86	920		7.58	DRG		
	11:13		7.585	DRG		
	1316		7.58	DRG		
	1516		7.54	A.B.		
	17:40		7.54	A.B		
	1921		7.52	MC		
	21:04		7.55	AB		
	23:09		7.54	MC		
	01:08		7.50	S.C		
10-9-86	03:31		7.48	S.C.		
	05:06		7.49	S.C.		
	06:54		7.48	S.C		
	09:47		7.54	DWD		
	11:14		7.54	D.W.D		
	13:17		7.52	D.W.D		
	15:31		7.50	AB		

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: ____________

PROJECT NUMBER: ____________

DATE: ____________

WELL NUMBER: 10-4

r IN FEET: ____________

STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
	17:08		7.49	A.B		
10/9/86	1931		7.48	MC		
	21:08		7.51	A.B		
	23:24		7.52	JB		
	01:12		7.51	JB		
10/10/86	03:16		7.50	AT		
	05:02		7.48	AT		
	07:06		7.49	AT		
	09:14		7.50	DRG		
	11:13		7.50	DRG		
	13:30		7.45	DRG		
	15:17		7.41	Y.A.		
	17:10		7.41	AB		
	19:10		7.40	Y.A.		
	21:07		7.42	AB		
	23:15		7.43	JG		
10/11/86	01:10		7.43	J.B		
	03:15		7.40	A.T		
	05:16		7.39	A.T		
	07:02		7.40	A.T.		
	9:11		7.41	A.B		
	11:17		7.465	DRG		
	13:11		7.43	DRG		
	15:28		7.38	AB		
	17:12		7.37	AB		
	17:10		7.41	MC		

FEI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: French Ltd. WELL NUMBER: 10-4
PROJECT NUMBER: ______ r IN FEET: ______
DATE: 10/11/86 STARTING WATER LEVEL: ______

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	2121		7.42	DD		
	2305		7.43	MC		
10-12-86	01:32		7.42	A.T.		
	03:25		7.40	J.B.		
	05:18		7.37	A.T		
	07:05		7.40	A.T		
	907		7.47	J.G		
	1109		7.47	J.G		
	1307		7.43	J.G		
	15:14		7.33	JG		
	1708		7.29	MC		
	1919		7.23	MC		
	21:06		7.23	AB		
	21:12		7.18	AB		
10-13-86	1:15		7.09	JB		
	3:06		7.04	HC		
	5:12		6.99	HC		
	7:04		6.98	HC		
	09:11		6.99	DRG		
	13:15		6.945	DRG		
	15 08		6.905	DRG		
	1932		6.82	SC		
	2313		6.82	SC		
10/14	0329		6.81	J.G		
	06:56		6.81	J.G		
	07:35		6.82	JG		
	10:06		6.88	DRG - double checked		
	1116		6.88	DRG		

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: 10-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r²	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:25		6.85	AB				
	19:15		6.90	AB				
	23:18		6.95	SC				
10/15/86	07:55		7.065	DRG				
	14:04		7.07	DRG				
	15:09		7.045	DRG				
	23:07		7.13	S.C				
10/16/86	7:05		7.14	SC				
	15:05		7.08	A.B.				
	23:13		7.10	S.C				
10/17/86	6:55		7.11	SC				
	14:00		7.12	AB				

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French
PROJECT NUMBER:
DATE: 10/7/86

WELL NUMBER: 10-3
r IN FEET:
STARTING WATER LEVEL:

10-7-86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
1455		7.07			
~~[illegible]~~ 1700		7.07			
~~[illegible]~~ 19.00		7.07			
2105		7.07			
23:05		7.10			
00:49		7.08	SC		
3:06		7.06	SC		
5:00		7.04	SC		
07:06		7.05	A.J		
9:17		7.06	DRG		
11:09		7.075	DRG		
1313		7.06	DRG		
1512		7.01	A.B.		
17:09		6.98	AB		
19:04		6.98	MC		
21:02		7.00	AB		
23:07		7.00	MC		
01:07		6.98	S.C		
03:29		6.98	S.C.		
05:05		6.97	S.C		
06:54		6.96	S.C		
906		7.01	D.W.D		
1113		7.03	D.W.D		
13:15		7.00	D.W.D		
15:29		6.98	A.B		

10-8-86

10-9-86

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: 10-3
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	17:06		6.96	A.B		
	1929		6.98	MC		
10/9/86	21:06		6.99	A.B.		
	23:23		7.01	JB		
	01:12		6.98	JB		
10/10/86	03:15		6.98	AT		
	05:01		6.97	AT		
	07:05		6.98	AT		
	09 17		6.99	DRG		
	11:10		6.99	DRG		
	13:28		6.94	DRG		
	15:06		6.89	J.A.		
	17:09		6.88	AB		
	19:08		6.89	J.A.		
	21:06		6.91	AB		
	23:15		6.92	S.G		
10/11/86	01:08		6.92	JB		
	03:15		6.89	A.T.		
	05:15		6.88	J.B.		
	07:00		6.89	A.T.		
	9:10		6.89	A.B		
	11:08		6.955	DRG		
	13:08		6.92	DRG		
	15:06		6.85	AB		
	1710		6.86	DD		
	1905		6.90	MC		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: French Ltd
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: 10-3
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/11/86	2118		6.91	NH		
	2307		6.90	MC		
	01:31		6.92	A.T.		
	03:22		6.90	J.B.		
	05:16		6.86	A.T		
10-12-86	07:04		6.90	A.T.		
	906		6.94	J.G		
	1109		6.94	J.G		
	1306		6.89	J.G		
	15:13		6.77	JG		
	1706		6.72	MC		
	1921		6.68	MC		
	21:04		6.67	AB		
	23:11		6.62	MC		
10-13-86	1:13		6.56	JB		
	3:03		6.51	MC		
	5:10		6.46	MC		
	7:02		6.45	MC		
	09:09		6.49	DRG		
	13:13		6.435	DRG		
	1506		6.385	DRG		
	1931		6.30	SC		
	2312		6.31	SC		
10/14	0328		6.32	J.G.		
	0654		6.32	J.G.		
	07:34		6.33	J.G.		
	10:05		6.385	D.R.G — double checked		
	1113		6.39	DRG		

FEI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ____________
DATE: 10-14-86

WELL NUMBER: 10-3
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:24		6.40	AB				
	19 13		6.39	AB				
	23:15		6.45	SC				
	07:59		6.55	DRG				
10/15/86	14:02		6.56	DRG				
	15:08		6.545	DRG				
	23:06		6.61	AB				
10/16/86	7:04		6.62	SC				
	15:04		6.56	AB				
	23:12		6.59	S.C.				
10/17/86	6:54		6.60	SC				
	13:58		6.61	AB				

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: 10-2
r IN FEET:
STARTING WATER LEVEL:

10-7-86

10-8-86

10-9-86

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
1500		5.73			
17:09		5.73			
19:10		5.72			
2118		5.72			
23:07		5.76			
00:51		5.73	SC		
3:08		5.72	SC		
5:03		5.70	SC		
7:08		5.68	A.T		
9:22		5.72	DRG		
11:15		5.73	DRG		
1:19		5.72	DRG		
1517		5.69	A.B.		
17:12		5.65	A.B		
1913		5.75	MC		
21:06		5.67	A.B		
2310		5.65	MC		
01:09		5.63	S.C.		
03:32		5.61	S.C		
05:07		5.61	S.C		
06:55		5.62	S.C		
9:10		5.655	D.W.D		
1117		5.68	D.W.D		
13:20		5.66	D.W.D		
15:33		5.62	AB.		

FEI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French UD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: 10-Z
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	17:11		5.62	A.B		
10/9/86	1933		5.60	MC		
	21:11		5.65	A.B		
	23:26		5.64	JB		
	01:14		5.62	J.B.		
	03:17		5.61	AT		
10/10/86	05:04		5.61	AT		
	07:07		5.62	AT		
	0916		5.65	DRG		
	11:14		5.64	DRG		
	13:32		5.595	DRG		
	15:20		5.57	T.A.		
	17:12		5.54	A.B		
	19:11		5.54	T.A.		
	21:09		5.56	AB		
	23:16		5.56	JG		
10/11/86	01:12		5.57	J.B.		
	03:17		5.51	A.T		
	05:17		5.53	J.B.		
	07:03		5.51	A.T.		
	9:13		5.55	A.B		
	11:14		5.59	DRG		
	13:13		5.58	DRG		
	15:10		5.55	AB		
	1714		5.51	DD		
	1914		5.54	MC		

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: French Ltd. WELL NUMBER: 10-2
PROJECT NUMBER: r IN FEET:
DATE: 10/11/86 STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	2123		5.55	DD		
	2308		5.56	MC		
10-12-86	01:34		5.54	AT		
	03:26		5.59	J.B.		
	05:19		5.50	A.T		
	07:06		5.52	A.T		
	908		5.61	J.G		
	1110		5.59	J.G		
	1308		5.54	J.G		
	1516		5.43	J.G		
	1710		5.38	MC		
	1924		5.32	MC		
	21:07		5.30	AB		
	23:14		5.26	MC.		
10-13-86	1:16		5.18	JB		
	3:09		5.12	AC		
	5:15		5.09	AC		
	7:35		5.10	AC		
	9:17		5.10	DRG		
	13:17		5.055	DRG		
	15:09		5.015	DRG		
	1933		4.93	SC		
	2314		4.95	MC		
10/14	03:30		4.94	J.G.		
	06:57		4.94	J.G.		
	07:36		4.93	JG.		
	10:03		5.015	DRG - double checked		
	11:15		5.02	DRG		

FEI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER: ____________
DATE: 10-4-86

WELL NUMBER: 10-2
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:27		5.01	AB				
	19:17		5.02	AB				
	23:20		5.10	SC				
	07:56		5.21	DRG				
10/15/86	14:06		5.235	DRG				
	15:10		5.205	DRG				
	~~15:08~~ 23:08		5.26	SC				
10/16/86	7:07		5.29	SC				
	15:06		5.25	A.B.				
	23:14		5.24	S.C				
10/17/86	6:57		5.24	SC				
	14:02		5.28	AB				

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: 10-1
r IN FEET:
STARTING WATER LEVEL:

45.96
38.82

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
1459		109.92			
17:06		109.50			
19:02		116.36			
2112		117.07			
22:57		117.61			
~~23 49~~ 00:42		117.88	SC		
3:00		118.33	SC		
4:51		118.72	SC		
0702		118.75	A.T		
909		118.81	DRG		
1102		119.00	DRG		
1304		119.33	DRG		
1507		119.68	A.B.		
17:03		119.81	A.B		
1909		120.13	MC		
20:58		120.36	AB		
23:02		120.58	MC		
01:02		120.90	SC		
03:25		121.08	SC		
05:00		121.19	S.C.		
06:50		121.30	S.C		
8:58		122.35	D.W.D		
11:05		122.36	D.W.D		
1207		122.45	D.W.D		
15:22		122.58	AB		

10-8-86

10-9-86

145
1945

FEI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER:
DATE: 10-9-86

WELL NUMBER: 10-1
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	16:55		122.75	A.B		
10/9/86	1915		122.95	MC		
	21:00		123.07	AB		
	23:16		123.25	JB		
10/10/86	01:03		123.41	JB		
	03:08		123.455	AT		
	04:55		124:43	AT		
	06:57		124.36	J.B.		
	09:03		123.925	DRG		
	11:03		123.74	DRG		
	13:17		124.49	DRG		
	15:11		124.47	J.A.		
	17:02		124.42	A.B		
	19:01		123.86	J.A.		
	21:01		123.87	AB		
	23:01		124.06	J.G.		
10/11/86	01:03		124.12	J.B.		
	03:07		124.19	AT		
	06:09		[illegible]	J.B		
	[illegible]:54		124.[illegible]	J.B.		
	9:05		124.50	AB		
	11:00		124.48	DRG		
	13:01		124.53	DRG		
	15:01		124.70	A.B		
	17:00		124.73	DD		
	18:56		124.75	MC		

REI

PUMP TEST DATA SHEET FOR SHEET

PROJECT NAME: French Ltd WELL NUMBER: 121
PROJECT NUMBER: r IN FEET:
DATE: 10/11/86 STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	~~2107~~		124.96	DD		
	2255		125.00	MC		
10-12-86	01:26		125.08	AG		
	03:17		125.11	JB		
	05:10		125.0[illegible]	[illegible]		
	06:58		125.24	A[illegible]		
	[illegible]		125.24	J.G		
1102	1[illegible]	125.26		J G		
10-12-86	1[illegible]			J.G		
	13:02		125.27	J.G		
	15:07		125.21	J.G		
	16 58		125.26	MC		
	1908		125.38	MC		
	20:58		125.67	AB		
	23:05		125.63	MC		
10-13-86	1.05		125.63	JB		
	02:57		125.47	HC		
	05:03		125.91	AC		
	6:58		125.72	HC		
	0901		125.83	DRG		
	10:36		126.06	DCG		
	13:02		126.74	DRG		
	1925		126.80	SC		
	2307		126.85	SC		
10-14/86	03:20		127.07	JG		
	06:50		127.18	J.G		
	0729		127.16	JG		
	09:53		127.32	DRG		

FEI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ____________
DATE: 10-14-86

WELL NUMBER: 10-1
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10-14-86	15:18		92.34	A.B				
	~~15:19~~ AB		~~38.75~~ AB	~~AB~~				
	19:04		90.45	A.B				
	23:09		90.15	SC				
10-15-86	07:49		88.97	DRG				
	08:26		88.92	DRG				
	13:54		88.285	DRG				
	15:03		88.18	DRG				
	23:01		87.48	S.C.				
10-16-86	06:58		86.89	SC				
	15:00		86.53	AB				
	23:06		85.95	SC.				
10-17-86	10:48		85.62	SC				
	13:52		85.17	AB				

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10/10

WELL NUMBER: 12-2
r IN FEET:
STARTING WATER LEVEL:

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
23:40		4.15	J.G.		
03:39		4.13	A-T		
07:20		4.15	A.J.		
9:32		4.15	AB		
11:36		4.15	DRG		
15:28		4.20	AB		
1748		4.13	DD		
2201		4.11	DD		
02:07		4.13	J.B		
03:51		4.10	A.T		
05:50		4.12	J.B.		
07:46		4.06	J.G.		
09:49		4.01	J.G.		
11:43		3.92	J.G.		
13:35		3.83	J.G.		
15:38		3.79	AB		
17:49		3.79	AB		
23:56		3.72	H.C.		
07:29		3.73	JB		
1455		MSD DRG 3.675	DRG		
19:56		3.68	SC		
23.45		3.69	J.G.		
10/14/86 03.54		3.72	J.G.		
07.26		3.74	J.G.		
09:34		3.78	DRG		
1226		3.785	DWD		
1304		3.785	DWD		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: 12-2
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
	13:43		3.94	A.T.				
10-15-86	15:49		3.95	AB				
10-17-86	10:28		4.05	AB				

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ____________
DATE: 10-7-86

WELL NUMBER: 3-4
r IN FEET: ____________
STARTING WATER LEVEL: ____________

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10-7-86	1515		82.92			
	17:22		83.41			
	19:14		83.77			
	2148		84.28			
	2310		84.52			
	104		84.81	SC		
	316		85.14	SC		
	510		85.37	SC		
	7:16		85.605	A.T		
	9:43		85.85	DRG		
	11:30		86.02	DRG		
10-8-86	1337		86.175	DRG		
	15:24		86.32	A.B.		
	17:21		86.43	AB		
	1933		86.58	MC		
	21:15		86.74	AB		
	23:18		86.88	MC		
10-9-86	01:21		87.04	SC		
	03:46		87.20	SC		
	05:18		87.30	SC		
	6:58		87.41	SC		
	9:15		87.55	D.W.D		
	11:31		87.695	D.W.D	← sounder gets	
	1328		87.815	DWD	caught on transducer	
	15:49		87.96	AB.	transducer moved back to original position after 10secs	

FEI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: 275-14
DATE: 10-9-86

WELL NUMBER: 3-4
r IN FEET:
STARTING WATER LEVEL:

MANUAL READINGS

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
	17:20		88.10	AB		
10/9/86	1950		88.18	MC		
	21:26		88.28	AB		
	23:45		88.41	JB		
	03:33		88.54	A.T		
10/10/86	07:15		88.74	AT		
	09:34		88.84	DRG		
	11:30		88.915	DRG		
	13:48		89.00	DRG		
	15:35		89.06	J.A.		
	17:24		89.15	A.B		
	19:21		89.20	[illegible]		
	21:21		89.27	AB		
	23:30		89.31	S.G.		
	03:31		89.40	A.T		
	07:13		89.53	A.T.		
	9:25		89.62	AB		
	11:29		89.67	DRG		
	13:26		89.695	DRG		
	15:21		89.85	AB		
	1737		89.87	DD		
	1932		89.93	MC		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: Finch LHO.
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: 3-41
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	2146		89.96	DR		
	2116.		89.99	MC		
	01:58		90.15	J.B.		
	03:42		90.10	A.T.		
	05:40		90.17	J.B		
	07:34		90.20	J.G		
	09:25		90.07	J.G.		
	11:34		89.94	J.G.		
	13:22		89.89	J.G.		
	15:28		89.92	JG		
MC	17:30		90.02	AB		
	23:45		90.30	MC		
	07:14		90.54	JB		
	14:53		90.57	DRG		
	19:44		90.72	SC		
~~10/13/86~~	23:35		90.84	J.G.		
~~10/13/86~~ 10/14/86	03:56		90.95	J.G.		
	07:15		91.04	J.G		
	09:46		91.105	DRG		

80.79
-90.30
-10.49

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: 3-4
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r²	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:44		88.90	AB				
	23:36		87.98	SC				
	07:44		86.935	DRG				
10/15/86	13:15		86.42	AT.				
	15:20		86.25	DRG				
	23:23		85.77	SC				
10/16/86	07:19		85.21	SC				
	15:14		84.84	A.B.				
	23.27		84.47	S.C				
10/17/86	7:08		84.18	SC				
	14:13		83.96.	AB.				

REI

PUMP TEST DATA SHEET FOR ____ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-7-86

WELL NUMBER: #11
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10-7-86	1512		81.32			
	17:25		81.79			
	19:17		82.24			
	2141		82.73			
	2312		83.02			
	00.58		83.29	SC		
	3:12		83.64	SC		
	507		83.89	SC		
	7:20		84.15	A.T		
	9:37		84.38	DRG		
10-8-86	11:26		84.56	DRG		
	1331		84.72	DRG		
	15:28 DRG		84.92	A.B.		
	17:25		85.02	A.B		
	1927		85.18	MC		
	21:19		85.39	AB		
	23:16		85.50	MC		
	01:18		85.66	SC		
10-9-86	03:42		85.83	SC		
	05:15		85.94	SC		
	6:56		86.06	SC		
	9:25		86.23	D.W.D		
	11:34		86.39	DWD		
	1331		86.515	DWD		
	15:44		86.66	AB		

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French LTD
PROJECT NUMBER:
DATE: 10-8-86

WELL NUMBER: #11
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	17:24		86.77	A.B.		
10/9/86	1944		86.88	MC		
	21:20		86.99	AB		
	23:31		87.12	JB		
	03:30		87.30	A-T.		
10/10/86	07:14		87.50	AT		
	09:28		87.59	DRG		
	11:25		87.68	DRG		
	13:44		87.78	DRG		
	15:32		87.84	J.A.		
	17.20		87.92	AB.		
	19:17		87.97	J.A.		
	21:16		88.02	AB		
	23:26		88.10	SG		
	03:27		88.21	A-T		
	07:10		88.33	A.T		
	9:21		88.41	AB		
	11:24		88.47	DRG		
	13:23		88.525	DRG		
	15.17		88.70	AB.		
	17:32		88.70	DW		
	1926		88.74	MC		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: French Ltd.
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: 11
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
10/11/86	2141		88.81	DD		
	2113		88.85	MC		
10-12-86	01:45		88.92	J.B.		
	03:38		88.95	A.T.		
	05:30		88.98	J.B		
	07:25		89.03	J.G.		
	09:24		88.92	J.G.		
	11:26		88.79	J.G.		
	13:17		88.74	J.G.		
	15:24		88.76	JG		
	17:25		88.85	AB		
	23:40		89.18	H.C.		
10-13-86	01:13		89.42	JB		
	14:37		89.44	DRG		
	19:41		89.6[illegible]	SC		
	23:28		89.75	[illegible]		
10/14/86	03:42		89.97	ETB		
	07:10		89.99	JG		
	09:52		90.04	DRG		
new transducer level of 5' lower	10:35		90.05	DRG		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER: ______
DATE: 10-14-86

WELL NUMBER: ~~12-1~~ 11
r IN FEET: ______
STARTING WATER LEVEL: ______

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10/14/86	15:46		87.94	AB				
	23:26		86.08	SC				
	07:37		84.975	DRG				
10/15/86	13:10		84.43	A.T.				
	15:29		84.22	DRG				
	23:17		83.65	SC				
10/16/86	07:15		83.15	SC				
	15:18		82.74	A.B.				
	23:22		82.36	S.C				
0/17/86	~~0~~ SC 7:05		82.06	SC				
	14:19		81.81	AB				

REI

PUMP TEST DATA SHEET FOR REI 10-1 Run #2 SHEET 1 OF

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 10-7-86

WELL NUMBER: REI 12-1
r IN FEET:
STARTING WATER LEVEL:

Manual Readings

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
	9:29	29	77.64	J.A.		
	11:22	142	77.66	J.A.		
10-7-86	13:16		77.81	J.A.		
	1523		78.08			
	19:26		78.71			
	2205		79.11			
	2324		79.39	SC		
	108		79.59	SC		
	3:25		79.95	SC		
	515		80.23	SC		
	7:26		80.54	A.J		
10-8	9:50		80.88	DRG		
	11:37		81.125	DRG		
	1345		81.34	DRG		
	1535		81.59	A.B.		
	17:31		81.77	AB		
	1943		81.82	MC		
	21:25		82.22	AB		
	23:17		82.38	MC		
	01:26		82.59	SC		
10-9	03:52		82.86	SC		
	05:25		82.96	SC		
	07:05		83.12	SC		
	9:34		83.345	D.W.D		
	11:43		83.525	D.W.D		
	13:37		83.69	D.W.D		
	15:55		83.89	AB		

REI

PUMP TEST DATA SHEET FOR ________ SHEET ___ OF ___

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 10-9-86

WELL NUMBER: REI 12-1
r IN FEET:
STARTING WATER LEVEL:

MANUAL READINGS

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
	17:30		84.02	A.B.		
	2000		84.19	MC		
10/9/86	21:32		84.34	AB.		
	23.54		84.45	JB		
	03:42		84.72	A.T		
10/10/86	07:22		84.96	A.T.		
	0940		85.105	DRG		
	11:36		85.22	DRG		
	13:56		85.35	DRG		
	15:44		85.46	[illegible]		
	17:30		85.56	AB		
	19:28		85.68	[illegible]		
	21:29		85.73	AB		
	23:33		85.88	J.G.		
	03:38		~~85.03~~ 86.03 A.T.	A-T		
10-11-86	07:18		86.21	A.T		
	9:31		86.33	A.B		
	11:35		86.39	DRG		
	15:27		86.67	AB		
	1746		86.69	DD		
	1939		86.78	MC		

REI

PUMP TEST DATA SHEET FOR ____ SHEET ___ OF ___

PROJECT NAME: Finch HQ
PROJECT NUMBER:
DATE: 10/11/86

WELL NUMBER: 12-1
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
10/11/86	2200		86.84	DD		
	2329		86.86	MC		
10-12-86	02:01		87.02	J.B.		
	03:51		87.02	A.T		
	05:45		87.13	J.B		
	07:46		87.13	J.G.		
	09:48		87.13	J.G		
	11:42		87.43	J.G.		
	13:34		87.13	J.G.		
	15:38		87.15	AB		
	17:38		87.69 AB	AB		
	23:55		87.72	M.C		
10-13-86	07:27		87.57	JB		
	14:53		87.73	DRG		
	19:55		87.87	SC		
	23:44		87.98	J.G.		
10/14/86	03.53		88.13	JG.		
	07.25		88.22	J.G.		
	09:33		88.30	DRG		
	12:25		88.37	DWD		
	1301		88.375	DWD		
	1405		88.365	DWD		

REI

PUMP TEST DATA SHEET FOR ______ SHEET ___ OF ___

PROJECT NAME: FRENCH LTD
PROJECT NUMBER:
DATE: 10-14-86

WELL NUMBER: 12-1
r IN FEET:
STARTING WATER LEVEL:

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
10-14	15:53		88.35	AB				
10-15	13:42		85.57	A.T.				
	15:44		85.35	A.B.				
10-17-86	14:27		82.13	AB				

Appendix 20

GW-25 Removal Log

~~degradation.~~ APPENDIX —

SUMMARY OF GW-25 WELL REMOVAL

DATE TIME

9/20/86 09:45

EVENT

A Failing Holemaster 1250 was set up over GW-25 and plumbed 90 degrees from horizontal. The well's steel protective casing was removed. A 5.5 inch diameter drill bit with a one foot long guiding nose was centered over the opening of the well. Drilling fluids consisting of fire hydrant water, bentonite jel, and mica flakes were mixed.

COMMENTS

The steel casing and the six inch diameter PVC surface casing were loose in the ground.

DATE TIME

9/20/86 14:15

EVENT

Six inch diameter surface casing was being removed from the ground in sections several feet long. No grout chunks were brought to the surface.

COMMENTS

The six inch casing showed no signs of degradation. The grout was erroded easily by jetted drilling fluids and was brought to the surface as a grey-green sediment within the drilling fluid.

DATE TIME

9/20/86 14:20

EVENT

Extremely viscous material of an almost jelly consistency was encountered at a depth of 17.5 feet. The material continued to a depth of 22 feet.

COMMENTS

The material was apparently a very thick bentonite jel mixture. While drilling through this material, the six inch casing was loose in the hole, and was pushed ahead of the drill bit down the hole.

DATE TIME
9/22/86 09:00

EVENT

Cement grout was encountered at 22 feet below the surface. The majority of six inch diameter casing was removed from the hole.

DATE TIME
9/22/86 14:00

EVENT

Black oily fluids started bubbling out of the boring. HNU readings were as high as eight ppm at the boring.

DATE TIME
9/23/86 13:55

EVENT

Drilling stopped at 55 feet below the surface because the drill bit seemed to have wandered out of the two inch diameter PVC casing.

COMMENTS

It was determined that although the bit was no longer in the two inch PVC, that it was still within the original boring, and that well destruction was continuing - as evidenced by the continued circulation to the surface of PVC cuttings, and grout material. The grout material had reverted back to being easily erroded by the drilling process, grout was only present in the cuttings as a grey-green sediment. It was decided that drilling would continue at a slow pace - guided by a study of drilling rate changes and cuttings.

DATE TIME
9/23/86 16:10

EVENT

The drill bit wandered into natural materials at 64 feet. The path of the well was refound using a regular 4 3/4 inch diameter drill bit.

COMMENTS

It appeared that difficulties in maintaining the diameter path of the well were due to two reasons. First, the grout was apparently not hard enough to prevent the two inch PVC casing from moving around in the hole as the drill bit rotated on it. Second, due to the flexibility of the original drilling rod used to install the well, the boring did not remain vertical with depth, but deflected in various directions.

DATE TIME
9/23/86 16:30

EVENT

Hard grout material was encountered at 65.5 feet and continued ~~down~~ to 70 feet below the surface. Below 70 feet the original boring was lost, and all cuttings suggesting well destruction stopped circulating to the surface. Drilling was terminated 75 feet below the surface in natural materials.

COMMENTS

It was decided that the boring would be slowly widened using a combination of increasing diameter drill bits and washing with drilling fluids to try and find the location of the original GW-25 boring which had apparently wandered to one side.

DATE TIME
9/25/86 12:46

EVENT

A 12 to 14 inch diameter boring had been drilled to a depth of 86 feet below the surface. The boring was apparently in natural materials from 70 to 86 feet. Washing of the boring with a water jet to attempt to uncover the original well boring was started.

DATE TIME
9/25/86 17:00

EVENT

A hole had been washed to a depth of 93 feet. The hole had then been widened with a 4 3/8 inch diameter drill bit. Samples of materials from 93 to 97 feet below the surface had been obtained with a split spoon sampler.

COMMENTS

No indications of well materials were seen between 86 and 97 feet. The samples were of natural soils. It was decided that the boring would be widened to 7 7/8 inches down to 97 feet, and that the hole would then be grouted to the surface.

DATE TIME
9/26/86 14:12

EVENT

The boring had been tremie grouted to the surface with a 96% cement , 4% bentonite jel mixture.

DATE TIME
9/29/86 07:00

EVENT

The grout seal was inspected. There was no indication of settling or cracking.

~~During the drilling out process it was found that the grout material was not ... providing an effective seal around the well casing and piping. Based on these observations ... it appears that downward leakage of water from the shallow to deep aquifers could have occurred because of an inadequate grout seal of the well annulus.~~

~~5.10.3 DISCUSSION OF GW-25 WELL REMOVAL~~

Well GW-25 was not completely removed. It is felt that the well was removed to a depth of at least 70 feet. Below that depth, the well probably remains intact. Because the shallow aquifers may continue to a depth of 76 feet below the surface, there was a six foot interval in which leakage could have possibly continued to occur. To counteract this, the boring was widened to at least 16 inches in that interval, ~~so as to hopefully~~ ANTICIPATING THIS WOULD expose the remaining well casing so that it would be plugged during the grouting process. The results of the REI 10-1 RUN #2 Pump Test ~~appear to~~ confirm ~~that~~ this approach was successfull.

DATA GATHERING TECHNIQUES:

Water Level Monitoring:	Water levels were measured with an Insitu Hydrologic Analysis System Model SE200 equipped with pressure transducers (accurary +-0.03 ft). Insitu measurement accuracy checked with manual readings taken with Well Wizard Series 6000 well sounders Fluid levels in the on-site pond were measured manually with a staff gauge.
Pumping Rate Monitoring:	Flow rate was measured at the pump discharge with a 5 gallon bucket and stop watch (accuracy = 0.2 gpm).

Meteorological Events:

Atmospheric Pressure, Atmospheric Temperature, and Relative Humidity:	Weathermeasure Metrograph with a 7 day drum graph. See Section _____
Start and Stop Times of Rain Events, Cloud Cover, Wind, and Misc. events:	Visual observation with record maintained in a log book

Appendix 21

Deep Aquifer Groundwater Analysis Reports

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds – GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4777	RESOURCE ENGINEERING	RES27514	WREI 11	860828		

NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	ND	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	ND	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0[A]	ND	18.0	0[A]
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	ND	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	ND	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	BMDL	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	ND	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	ND	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4777	RESOURCE ENGINEERING	RES27514	WREI 11	860828		

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
1A	2-Chlorophenol	ND	3.3	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	2.7	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	ND	2.7	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	24	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	42	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	3.6	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	2.4	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.0	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	3.6	ND	ND	ND	100	56	ND	104	46
10A	Phenol	ND	1.5	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	2.7	ND	ND	ND	100	80	ND	104	85

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4777	RESOURCE ENGINEERING	RES27514	WREI 11	860828		

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	1.9	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	3.5	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	1.9	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	44	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	7.8	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	2.5	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	10	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	4.1	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	3.5	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	5.3	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	5.7	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	5.7	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	ND	10	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	1.9	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	10	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	1.9	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	4.2	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	2.5	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	10	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	1.9	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	1.9	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	4.4	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	17	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	10	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	10	ND	ND	ND	100	15[a]	ND	104	19[a]
26B	Di-n-butyl phthalate	ND	10	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	5.7	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	1.9	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	ND	10	ND	ND	ND	100	76	ND	104	69
30B	1,2-Diphenylhydrazine	ND	10	ND	ND	ND	100	91	ND	104	90
31B	Fluoranthene	ND	2.2	ND	ND	ND	100	81	ND	104	87
32B	Fluorene	ND	1.9	ND	ND	ND	100	82	ND	104	82

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4777	RESOURCE ENGINEERING	RES27514	WREI 11	860828		

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	1.9	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	.90	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	10	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	1.6	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	4.7	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.2	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	ND	1.6	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	1.9	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	10	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	10	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	1.9	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	5.4	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	1.9	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	1.9	ND	ND	ND	100	102	ND	104	109

R Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 15, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4777	RESOURCE ENGINEERING	RES27514	WREI 11	86082		0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	99	88	110
p-Bromofluorobenzene	.250	105	86	115
1,2-Dichloroethane-D4	.250	100	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	42	10	94
2-Fluorophenol	100	56	21	100
2,4,6-Tribromophenol	100	59	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	95	35	114
2-Fluorobiphenyl	50	67	43	116
Terphenyl-D14	50	86	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

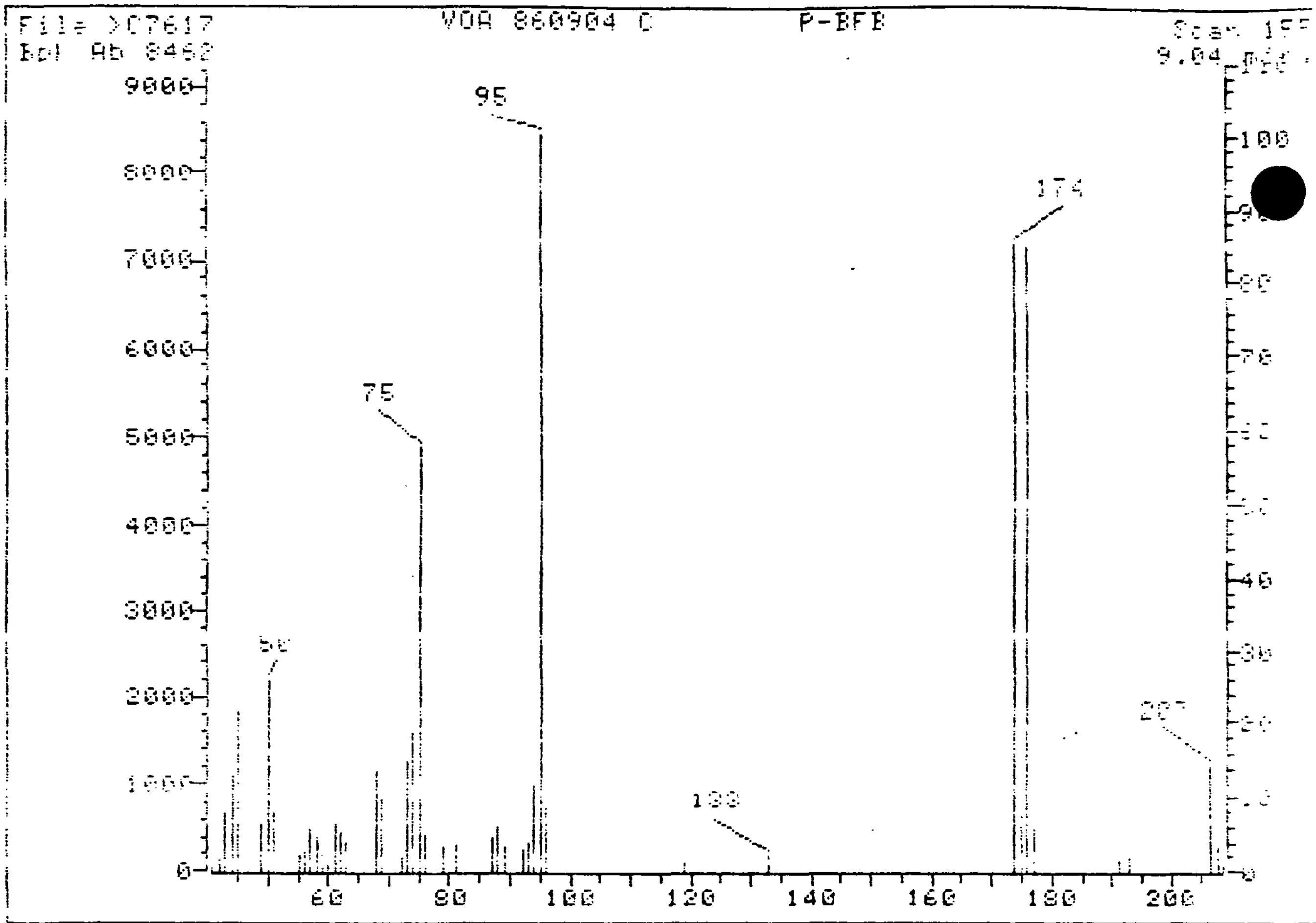


TABLE 2: METHOD PERFORMANCE DATA (QR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

M/Z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	25.02	25.02	OK
75	30-60% of mass 95	57.54	57.54	OK
95	Base peak, 100% relative abundance	100.00	100.00	OK
96	5-9% of mass 95	8.33	8.33	OK
173	Less than 1% of mass 95	0.00	0.00	OK
174	Greater than 50% of mass 95	84.89	84.89	OK
175	5-9% of mass 174	7.41	8.73	OK
176	95-101% of mass 174	84.85	99.96	OK
177	5-9% of mass 176	5.72	6.74	OK

Injection Date: 09/04/86 Analyst: [illegible signature]
Injection Time: 05:10 Processor: [illegible]
Run No: >C7617 QC Batch: QVS474
Spectrum No: 155 Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4775, N4779, N4780, N4776, N4180

Y.F.
9/6/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4775	RESOURCE ENGINEERING	RES27514	WREI 7	860829	1230	1

NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	ND	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	ND	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0A	ND	18.0	0A
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	ND	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	ND	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	BMDL	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	ND	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	ND	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4775	RESOURCE ENGINEERING	RES27514	WREI 7	860829	1230	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1A	2-Chlorophenol	ND	4.1	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	3.4	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	ND	3.4	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	30	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	53	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	4.5	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	3.0	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.8	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	4.5	ND	ND	ND	100	56	ND	104	46
10A	Phenol	ND	1.9	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	3.4	ND	ND	ND	100	80	ND	104	85

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4775	RESOURCE ENGINEERING	RES27514	WREI 7	860829	1230	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1B	Acenaphthene	ND	2.4	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	4.4	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	2.4	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	55	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	9.8	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	3.1	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	13	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	5.1	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	4.4	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	6.6	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	7.1	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	7.1	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	140	13	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	2.4	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	13	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	2.4	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	5.3	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	3.1	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	13	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	2.4	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	2.4	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	5.5	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	21	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	13	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	13	ND	ND	ND	100	15 R	ND	104	19 R
26B	Di-n-butyl phthalate	ND	13	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	7.1	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	2.4	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	BMDL	13	ND	ND	ND	100	76	ND	104	69
[illegible]B	1,2-Diphenyl[illegible]drazine	ND	13	ND	ND	ND	100	91	ND	104	90
[illegible]	[illegible]luoranthene	ND	2.8	ND	ND	ND	100	81	ND	104	87
[illegible]	[illegible]ne	ND	2.4	ND	ND	ND	100	82	ND	104	82

ETC *ENVIRONMENTAL TESTING and CERTIFICATION*

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4775	RESOURCE ENGINEERING	RES27514	WREI 7	860829	1230	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
33B	Hexachlorobenzene	ND	2.4	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	1.1	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	13	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	2.0	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	5.9	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.8	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	ND	2.0	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	2.4	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	13	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	13	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	2.4	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	6.8	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	2.4	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	2.4	ND	ND	ND	100	102	ND	104	109

A Recovery normally [illegible] using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4775	RESOURCE ENGINEERING	RES27514	WREI 7	86082	1230	1

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	99	88	110
p-Bromofluorobenzene	.250	105	86	115
1,2-Dichloroethane-D4	.250	106	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	43	10	94
2-Fluorophenol	100	58	21	100
2,4,6-Tribromophenol	100	47	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	112	35	114
2-Fluorobiphenyl	50	68	43	116
Terphenyl-D14	50	58	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits
** Advisory Limits Only

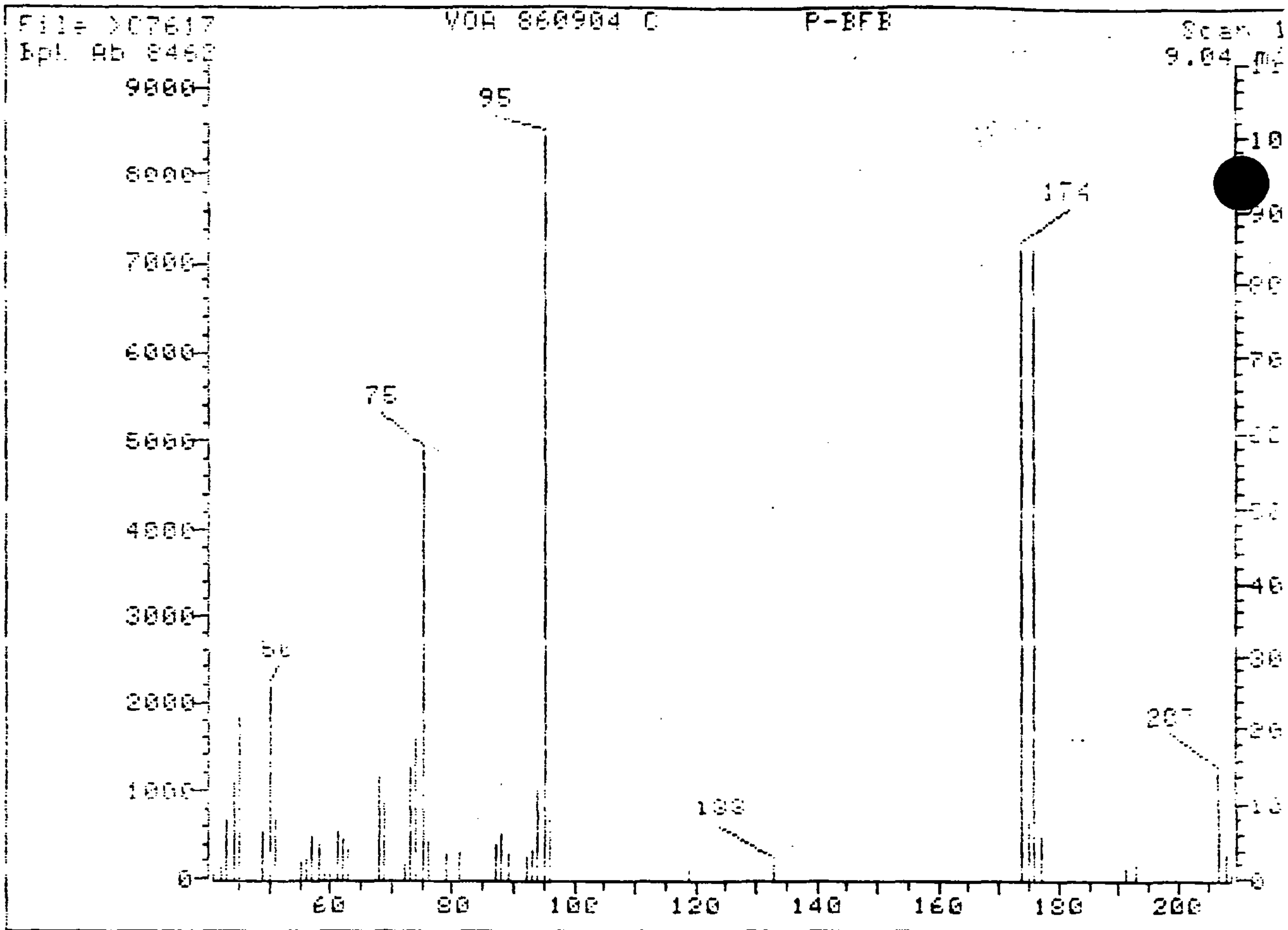


TABLE 2: METHOD PERFORMANCE DATA (OR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.02	25.02	Ok
75	30-60% of mass 95	57.54	57.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.33	6.33	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	84.89	84.89	Ok
175	5-9% of mass 174	7.41	8.73	Ok
176	95-101% of mass 174	84.85	99.96	Ok
177	5-9% of mass 176	5.[illegible]	6.74	Ok

Injection Date: 09/04/86
Injection Time: 03:10
Run No: >C7617
Spectrum No: 155

Analyst: [signature]
Processor: [illegible]
QC Batch: QVS474
Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4773, N4779, N4780, N4776, N[illegible]

Y.L. 9/6/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4776	RESOURCE ENGINEERING	RES27514	WREI 12-1	860829	1430	1

NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	ND	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	ND	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0 A	ND	18.0	0 A
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	ND	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	ND	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	4.95	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	ND	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	ND	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4776	RESOURCE ENGINEERING	RES27514	WREI 12-1	860829	1430	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1A	2-Chlorophenol	ND	3.8	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	3.1	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	ND	3.1	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	28	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	48	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	4.1	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	2.8	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.4	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	4.1	ND	ND	ND	100	56	ND	104	46
10A	Phenol	ND	1.7	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	3.1	ND	ND	ND	100	80	ND	104	85

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4776	RESOURCE ENGINEERING	RES27514	WREI 12-1	860829	1430	1

		Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
NPDES Number	Compound	Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
1B	Acenaphthene	ND	2.2	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	4.0	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	2.2	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	51	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	9.0	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	2.9	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	11	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	4.7	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	4.0	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	6.1	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	6.6	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	6.6	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	BMDL	11	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	2.2	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	11	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	2.2	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	4.8	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	2.9	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	11	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	2.2	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	2.2	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	5.1	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	19	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	11	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	11	ND	ND	ND	100	15[a]	ND	104	19[a]
26B	Di-n-butyl phthalate	ND	11	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	6.6	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	2.2	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	ND	11	ND	ND	ND	100	76	ND	104	69
30B	1,2-Diphenylhydrazine	ND	11	ND	ND	ND	100	91	ND	104	90
31B	Fluoranthene	ND	2.5	ND	ND	ND	100	81	ND	104	87
32B	Fluorene	ND	2.2	ND	ND	ND	100	82	ND	104	82

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4776	RESOURCE ENGINEERING	RES27514	WREI 12-1	860829	1430	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
33B	Hexachlorobenzene	ND	2.2	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	1.0	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	11	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	1.8	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	5.4	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.5	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	ND	1.8	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	2.2	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	11	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	11	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	2.2	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	6.2	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	2.2	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	2.2	ND	ND	ND	100	102	ND	104	109

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 15 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4776	RESOURCE ENGINEERING	RES27514	WREI 12-1	86082	1430	1

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	97	88	110
p-Bromofluorobenzene	.250	101	86	115
1,2-Dichloroethane-D4	.250	98	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	37	10	94
2-Fluorophenol	100	50	21	100
2,4,6-Tribromophenol	100	47	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	90	35	114
2-Fluorobiphenyl	50	56	43	116
Terphenyl-D14	50	125	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

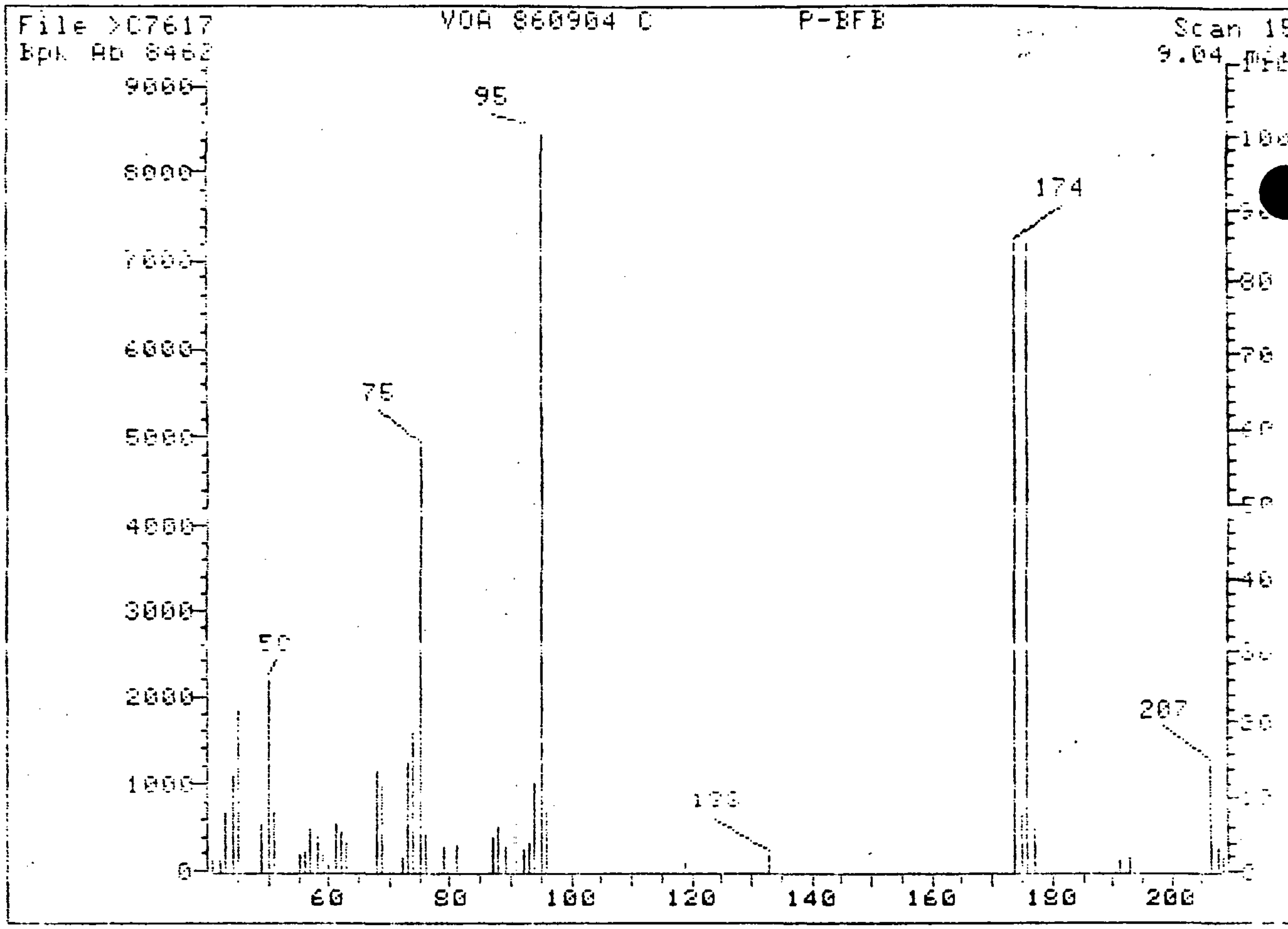


TABLE 2: METHOD PERFORMANCE DATA (QR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

		% Relative Abundance		
M/Z	Ion Abundance Criteria	Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	25.82	25.82	Ok
75	30-60% of mass 95	57.54	57.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.33	8.33	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	64.09	84.89	Ok
175	5-9% of mass 174	7.41	8.73	Ok
176	95-101% of mass 174	84.85	99.96	Ok
177	5-9% of mass 176	5.72	6.74	Ok

Injection Date: 09/04/86 Analyst: [signature]
Injection Time: 05:14 Processor: Susan D. Christopherson
Run No: >C7617 QC Batch: QVS474
Spectrum No: 155 Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4775, N4779, N4780, N4776, N413

JK 9/6/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4778	RESOURCE ENGINEERING	RES27514	WREI 3-4	860828	1910	1

		Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	ND	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	ND	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0[a]	ND	18.0	0[a]
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	ND	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	ND	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	ND	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	ND	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	ND	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

[a] Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4778	RESOURCE ENGINEERING	RES27514	WREI 3-4	860828	1910	1

NPDES Number	Compound	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1A	2-Chlorophenol	ND	3.9	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	3.2	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	ND	3.2	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	29	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	50	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	4.3	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	2.9	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.6	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	4.3	ND	ND	ND	100	56	ND	104	46
10A	Phenol	ND	1.8	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	3.2	ND	ND	ND	100	80	ND	104	85

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4778	RESOURCE ENGINEERING	RES27514	WREI 3-4	860828	1910	1

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1B	Acenaphthene	ND	2.3	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	4.2	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	2.3	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	52	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	9.3	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	3.0	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	12	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	4.9	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	4.2	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	6.3	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	6.8	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	6.8	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	ND	12	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	2.3	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	12	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	2.3	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	5.0	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	3.0	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	12	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	2.3	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	2.3	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	5.2	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	20	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	12	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	12	ND	ND	ND	100	15[a]	ND	104	19[a]
26B	Di-n-butyl phthalate	ND	12	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	6.8	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	2.3	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	ND	12	ND	ND	ND	100	76	ND	104	69
30B	1,2-Diphenylhydrazine	ND	12	ND	ND	ND	100	91	ND	104	90
31B	Fluoranthene	ND	2.6	ND	ND	ND	100	81	ND	104	87
32B	Fluorene	ND	2.3	ND	ND	ND	100	82	ND	104	82

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4778	RESOURCE ENGINEERING	RES27514	WREI 3-4	860828	1910	1

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	2.3	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	1.1	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	12	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	1.9	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	5.6	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.6	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	ND	1.9	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	2.3	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	12	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	12	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	2.3	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	6.4	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	2.3	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	2.3	ND	ND	ND	100	102	ND	104	109

R Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4778	RESOURCE ENGINEERING	RES27514	WREI 3-4	86082	1910	1

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	97	88	110
p-Bromofluorobenzene	.250	104	86	115
1,2-Dichloroethane-D4	.250	104	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	41	10	94
2-Fluorophenol	100	58	21	100
2,4,6-Tribromophenol	100	57	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	88	35	114
2-Fluorobiphenyl	50	69	43	116
Terphenyl-D14	50	80	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

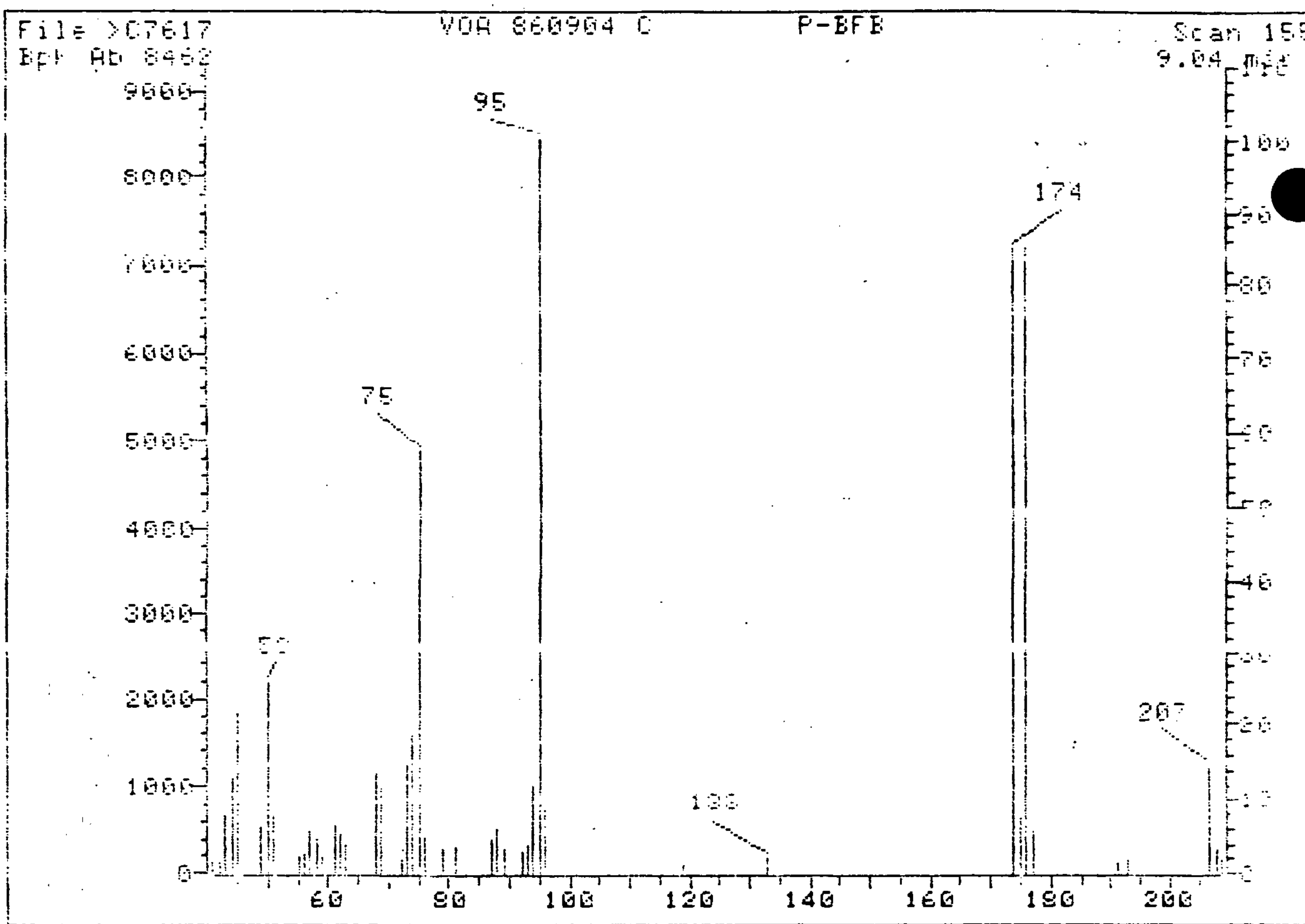


TABLE 2: METHOD PERFORMANCE DATA (QR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

M/Z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.82	25.82	OK
75	30-60% of mass 95	57.54	57.54	OK
95	Base peak, 100% relative abundance	100.00	100.00	OK
96	5-9% of mass 95	8.33	8.33	OK
173	Less than 1% of mass 95	0.00	0.00	OK
174	Greater than 50% of mass 95	84.89	84.89	OK
175	5-9% of mass 174	7.41	8.73	OK
176	95-101% of mass 174	84.85	99.96	OK
177	5-9% of mass 176	5.72	6.74	OK

Injection Date: 09/04/86 Analyst: [signature]
Injection Time: 05:16 Processor: Susan D. Christopherson
Run No: >C7617 QC Batch: QVS474
Spectrum No: 155 Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4775, N4779, N4780, N4776, N4180

Y.K.
9/6/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4779	RESOURCE ENGINEERING	RES27514	WREI 10-1	860828	1400	

NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	ND	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	ND	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0 A	ND	18.0	0 A
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	ND	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	ND	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	ND	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	ND	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	ND	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4779	RESOURCE ENGINEERING	RES27514	WREI 10-1	860828	1400	

NPDES Number	Compound	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
1A	2-Chlorophenol	ND	3.6	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	2.9	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	ND	2.9	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	26	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	46	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	3.9	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	2.6	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.3	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	3.9	ND	ND	ND	100	56	ND	104	46
10A	Phenol	4.16	1.6	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	2.9	ND	ND	ND	100	80	ND	104	85

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4779	RESOURCE ENGINEERING	RES27514	WREI 10-1	860828	1400	

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	2.1	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	3.8	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	2.1	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	48	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	8.5	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	2.7	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	11	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	4.5	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	3.8	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	5.8	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	6.2	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	6.2	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	ND	11	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	2.1	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	11	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	2.1	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	4.6	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	2.7	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	11	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	2.1	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	2.1	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	4.8	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	18	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	11	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	11	ND	ND	ND	100	15[a]	ND	104	19[a]
26B	Di-n-butyl phthalate	ND	11	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	6.2	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	2.1	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	ND	11	ND	ND	ND	100	76	ND	104	69
30B	1,2-Diphenylhydrazine	ND	11	ND	ND	ND	100	91	ND	104	90
31B	Fluoranthene	ND	2.4	ND	ND	ND	100	81	ND	104	87
32B	Fluorene	ND	2.1	ND	ND	ND	100	82	ND	104	82

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4779	RESOURCE ENGINEERING	RES27514	WREI 10-1	860828	1400	

NPDES Number	Compound	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	2.1	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	.98	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	11	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	1.7	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	5.1	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.4	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	ND	1.7	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	2.1	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	11	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	11	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	2.1	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	5.9	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	2.1	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	2.1	ND	ND	ND	100	102	ND	104	109

A Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 15, 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery – Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4779	RESOURCE ENGINEERING	RES27514	WREI 10-1	86082	1400	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	97	88	110
p-Bromofluorobenzene	.250	104	86	115
1,2-Dichloroethane-D4	.250	101	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	43	10	94
2-Fluorophenol	100	54	21	100
2,4,6-Tribromophenol	100	59	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	86	35	114
2-Fluorobiphenyl	50	62	43	116
Terphenyl-D14	50	62	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

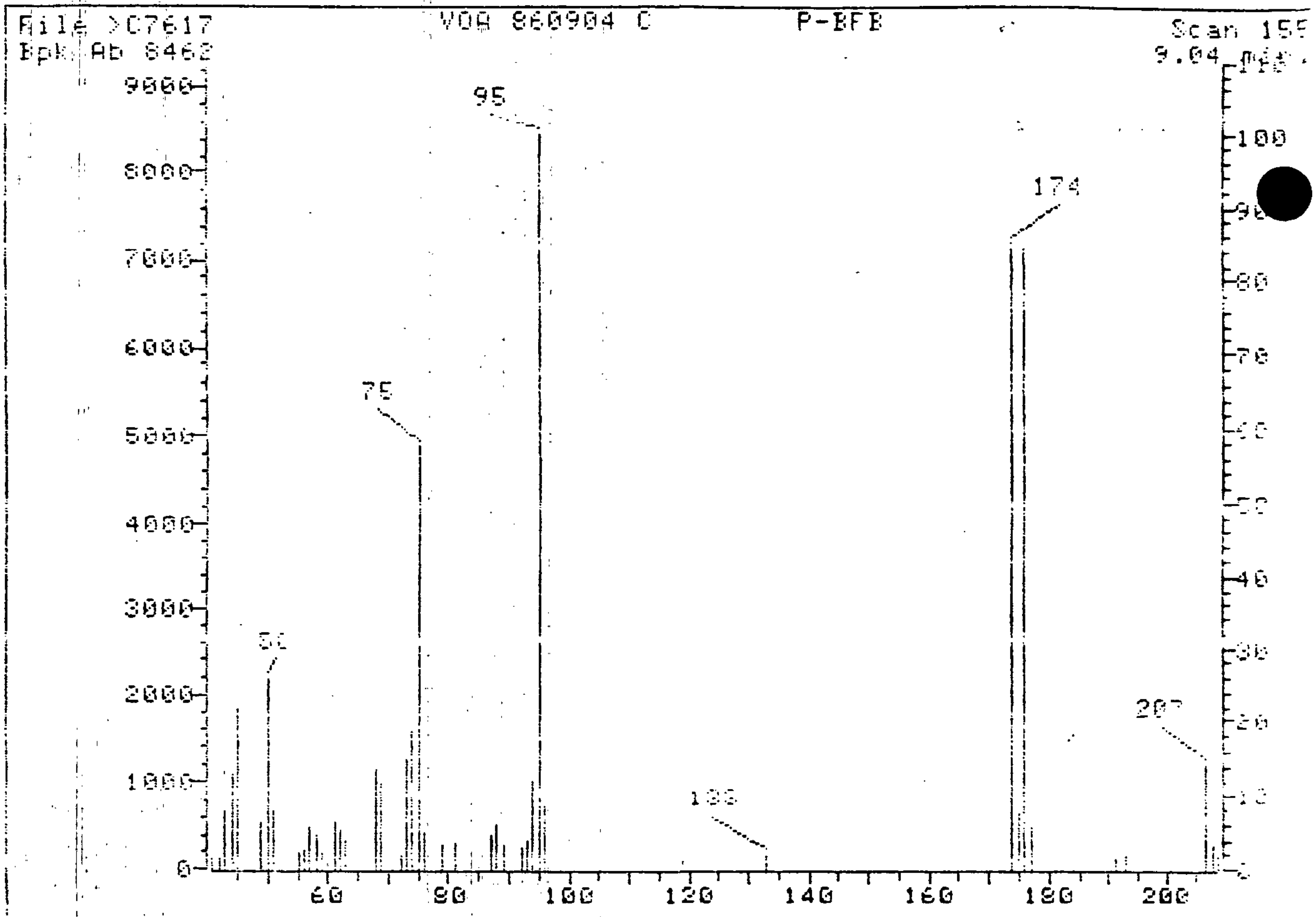


TABLE 2: METHOD PERFORMANCE DATA (QR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

M/Z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	25.82	25.82	Ok
75	30-60% of mass 95	57.54	57.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.33	6.33	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	84.89	84.89	Ok
175	5-9% of mass 174	7.41	8.73	Ok
176	95-101% of mass 174	84.85	99.96	Ok
177	5-9% of mass 176	5.72	6.74	Ok

Injection Date: 09/04/86 Analyst: [signature]
Injection Time: 03:16 Processor: ALLAN D. CHRISTOPHER
Run No: >C7617 QC Batch: QVS474
Spectrum No: 155 Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4775, N4779, N4780, N4776, N4180

u.f. 9/6/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 8, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4780	RESOURCE ENGINEERING	RES27514	WGW-25	860828	1130	

NPDES Number	Compound (Acrolein and Acrylonitrile values are screen only.)	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1V	Acrolein	ND	100	ND	ND	ND	800	113	ND	800	76
2V	Acrylonitrile	ND	100	ND	ND	ND	80.0	96	ND	80.0	77
3V	Benzene	101	4.4	ND	ND	ND	18.0	98	ND	18.0	98
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	4.7	ND	ND	ND	18.0	99	ND	18.0	82
6V	Carbon tetrachloride	ND	2.8	ND	ND	ND	18.0	102	ND	18.0	105
7V	Chlorobenzene	ND	6.0	ND	ND	ND	18.0	101	ND	18.0	101
8V	Chlorodibromomethane	ND	3.1	ND	ND	ND	18.0	101	ND	18.0	90
9V	Chloroethane	56.1	10	ND	ND	ND	18.0	104	ND	18.0	91
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	18.0	0[a]	ND	18.0	0[a]
11V	Chloroform	ND	1.6	ND	ND	ND	18.0	103	ND	18.0	102
12V	Dichlorobromomethane	ND	2.2	ND	ND	ND	18.0	103	ND	18.0	100
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	18.0	110	ND	18.0	91
14V	1,1-Dichloroethane	87.1	4.7	ND	ND	ND	18.0	100	ND	18.0	104
15V	1,2-Dichloroethane	ND	2.8	ND	ND	ND	18.0	105	ND	18.0	93
16V	1,1-Dichloroethylene	ND	2.8	ND	ND	ND	18.0	100	ND	18.0	105
17V	1,2-Dichloropropane	ND	6.0	ND	ND	ND	18.0	100	ND	18.0	94
18V	cis-1,3-Dichloropropylene	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	95
19V	Ethylbenzene	16.1	7.2	ND	ND	ND	18.0	101	ND	18.0	104
20V	Methyl bromide	ND	10	ND	ND	ND	18.0	109	ND	18.0	86
21V	Methyl chloride	ND	10	ND	ND	ND	18.0	106	ND	18.0	115
22V	Methylene chloride	5.33	2.8	3.05	5.73	5.10	18.0	90	2.94	18.0	117
23V	1,1,2,2-Tetrachloroethane	ND	6.9	ND	ND	ND	18.0	103	ND	18.0	94
24V	Tetrachloroethylene	ND	4.1	ND	ND	ND	18.0	99	ND	18.0	101
25V	Toluene	42.0	6.0	ND	ND	ND	18.0	101	ND	18.0	102
26V	1,2-Trans-dichloroethylene	17.8	1.6	ND	ND	ND	18.0	100	ND	18.0	104
27V	1,1,1-Trichloroethane	ND	3.8	ND	ND	ND	18.0	104	ND	18.0	105
28V	1,1,2-Trichloroethane	ND	5.0	ND	ND	ND	18.0	102	ND	18.0	88
29V	Trichloroethylene	ND	1.9	ND	ND	ND	18.0	98	ND	18.0	91
30V	Trichlorofluoromethane	ND	10	ND	ND	ND	18.0	103	ND	18.0	109
31V	Vinyl chloride	226	10	ND	ND	ND	18.0	103	ND	18.0	94
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	18.0	101	ND	18.0	95

[a] Recovery normally variable using established methodology.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 13, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4780	RESOURCE ENGINEERING	RES27514	WGW-25	860828	1130	

NPDES Number	Compound	Results: Sample Concen ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen Added ug/l	QC Matrix Spike: % Recov
1A	2-Chlorophenol	ND	3.3	ND	ND	ND	100	75	ND	104	75
2A	2,4-Dichlorophenol	ND	2.7	ND	ND	ND	100	67	ND	104	74
3A	2,4-Dimethylphenol	3.15	2.7	ND	ND	ND	100	68	ND	104	70
4A	4,6-Dinitro-o-cresol	ND	24	ND	ND	ND	100	67	ND	104	53
5A	2,4-Dinitrophenol	ND	42	ND	ND	ND	100	74	ND	104	62
6A	2-Nitrophenol	ND	3.6	ND	ND	ND	100	71	ND	104	75
7A	4-Nitrophenol	ND	2.4	ND	ND	ND	100	39	ND	104	36
8A	p-Chloro-m-cresol	ND	3.0	ND	ND	ND	100	60	ND	104	62
9A	Pentachlorophenol	ND	3.6	ND	ND	ND	100	56	ND	104	46
10A	Phenol	89.2	1.5	4.16	2.82	ND	100	38	ND	104	44
11A	2,4,6-Trichlorophenol	ND	2.7	ND	ND	ND	100	80	ND	104	85

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4780	RESOURCE ENGINEERING	RES27514	WGW-25	860828	1130	

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
1B	Acenaphthene	ND	1.9	ND	ND	ND	100	77	ND	104	79
2B	Acenaphthylene	ND	3.5	ND	ND	ND	100	78	ND	104	81
3B	Anthracene	ND	1.9	ND	ND	ND	100	76	ND	104	77
4B	Benzidine	ND	44	ND	ND	ND	100	53	ND	104	74
5B	Benzo(a)anthracene	ND	7.8	ND	ND	ND	100	75	ND	104	71
6B	Benzo(a)pyrene	ND	2.5	ND	ND	ND	100	67	ND	104	44
7B	Benzo(b)fluoranthene	ND	10	ND	ND	ND	100	73	ND	104	60
8B	Benzo(ghi)perylene	ND	4.1	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	3.5	ND	ND	ND	100	66	ND	104	66
10B	bis(2-Chloroethoxy)methane	ND	5.3	ND	ND	ND	100	74	ND	104	75
11B	bis(2-Chloroethyl) ether	ND	5.7	ND	ND	ND	100	81	ND	104	77
12B	bis(2-Chloroisopropyl)ether	ND	5.7	ND	ND	ND	100	99	ND	104	87
13B	bis(2-Ethylhexyl)phthalate	11.7	10	ND	ND	ND	100	79	ND	104	74
14B	4-Bromophenyl phenyl ether	ND	1.9	ND	ND	ND	100	72	ND	104	71
15B	Butyl benzyl phthalate	ND	10	ND	ND	ND	100	66	ND	104	55
16B	2-Chloronaphthalene	ND	1.9	ND	ND	ND	100	74	ND	104	75
17B	4-Chlorophenyl phenyl ether	ND	4.2	ND	ND	ND	100	82	ND	104	83
18B	Chrysene	ND	2.5	ND	ND	ND	100	77	ND	104	74
19B	Dibenzo(a,h)anthracene	ND	10	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	1.9	ND	ND	ND	100	72	ND	104	80
21B	1,3-Dichlorobenzene	ND	1.9	ND	ND	ND	100	64	ND	104	79
22B	1,4-Dichlorobenzene	ND	4.4	ND	ND	ND	100	69	ND	104	79
23B	3,3'-Dichlorobenzidine	ND	17	ND	ND	ND	100	69	ND	104	63
24B	Diethyl phthalate	ND	10	ND	ND	ND	100	36	ND	104	33
25B	Dimethyl phthalate	ND	10	ND	ND	ND	100	15R	ND	104	19R
26B	Di-n-butyl phthalate	ND	10	ND	ND	BMDL	100	70	ND	104	66
27B	2,4-Dinitrotoluene	ND	5.7	ND	ND	ND	100	85	ND	104	79
28B	2,6-Dinitrotoluene	ND	1.9	ND	ND	ND	100	83	ND	104	78
29B	Di-n-octyl phthalate	ND	10	ND	ND	ND	100	76	ND	104	69
30B	1,2-Diphenylhydrazine	ND	10	ND	ND	ND	100	91	ND	104	90
31B	Fluoranthene	ND	2.2	ND	ND	ND	100	81	ND	104	87
32B	Fluorene	ND	1.9	ND	ND	ND	100	82	ND	104	82

ETC ENVIRONMENTAL TESTING and CERTIFICATION

SEP 16, 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4780	RESOURCE ENGINEERING	RES27514	WGW-25	860828	1130	

NPDES Number	Compound	Results: Sample Concen. ug/l	Results: MDL ug/l	QC Replicate: First ug/l	QC Replicate: Second ug/l	QC Blank and Spiked Blank: Blank Data ug/l	QC Blank and Spiked Blank: Concen. Added ug/l	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/l	QC Matrix Spike: Concen. Added ug/l	QC Matrix Spike: % Recov
33B	Hexachlorobenzene	ND	1.9	ND	ND	ND	100	74	ND	104	72
34B	Hexachlorobutadiene	ND	.90	ND	ND	ND	100	57	ND	104	73
35B	Hexachlorocyclopentadiene	ND	10	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	1.6	ND	ND	ND	100	52	ND	104	79
37B	Indeno(1,2,3-c,d)pyrene	ND	4.7	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	2.2	ND	ND	ND	100	77	ND	104	80
39B	Naphthalene	7.83	1.6	ND	ND	ND	100	69	ND	104	66
40B	Nitrobenzene	ND	1.9	ND	ND	ND	100	75	ND	104	74
41B	N-Nitrosodimethylamine	ND	10	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	10	ND	ND	ND	100	76	ND	104	72
43B	N-Nitrosodiphenylamine	ND	1.9	ND	ND	ND	100	86	ND	104	86
44B	Phenanthrene	ND	5.4	ND	ND	ND	100	77	ND	104	75
45B	Pyrene	ND	1.9	ND	ND	ND	100	80	ND	104	85
46B	1,2,4-Trichlorobenzene	ND	1.9	ND	ND	ND	100	102	ND	104	109

A Recovery normally variable using established methodology.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery - Aqueous Matrices (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
N4780	RESOURCE ENGINEERING	RES27514	WGW-25	86082	1130	0

Compound	Amount added ug	% Recovery	Control Limits*	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	100	88	110
p-Bromofluorobenzene	.250	102	86	115
1,2-Dichloroethane-D4	.250	98	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	100	85	10	94
2-Fluorophenol	100	56	21	100
2,4,6-Tribromophenol	100	63	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	50	111	35	114
2-Fluorobiphenyl	50	83	43	116
Terphenyl-D14	50	85	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

* IFB EPA Control Limits

** Advisory Limits Only

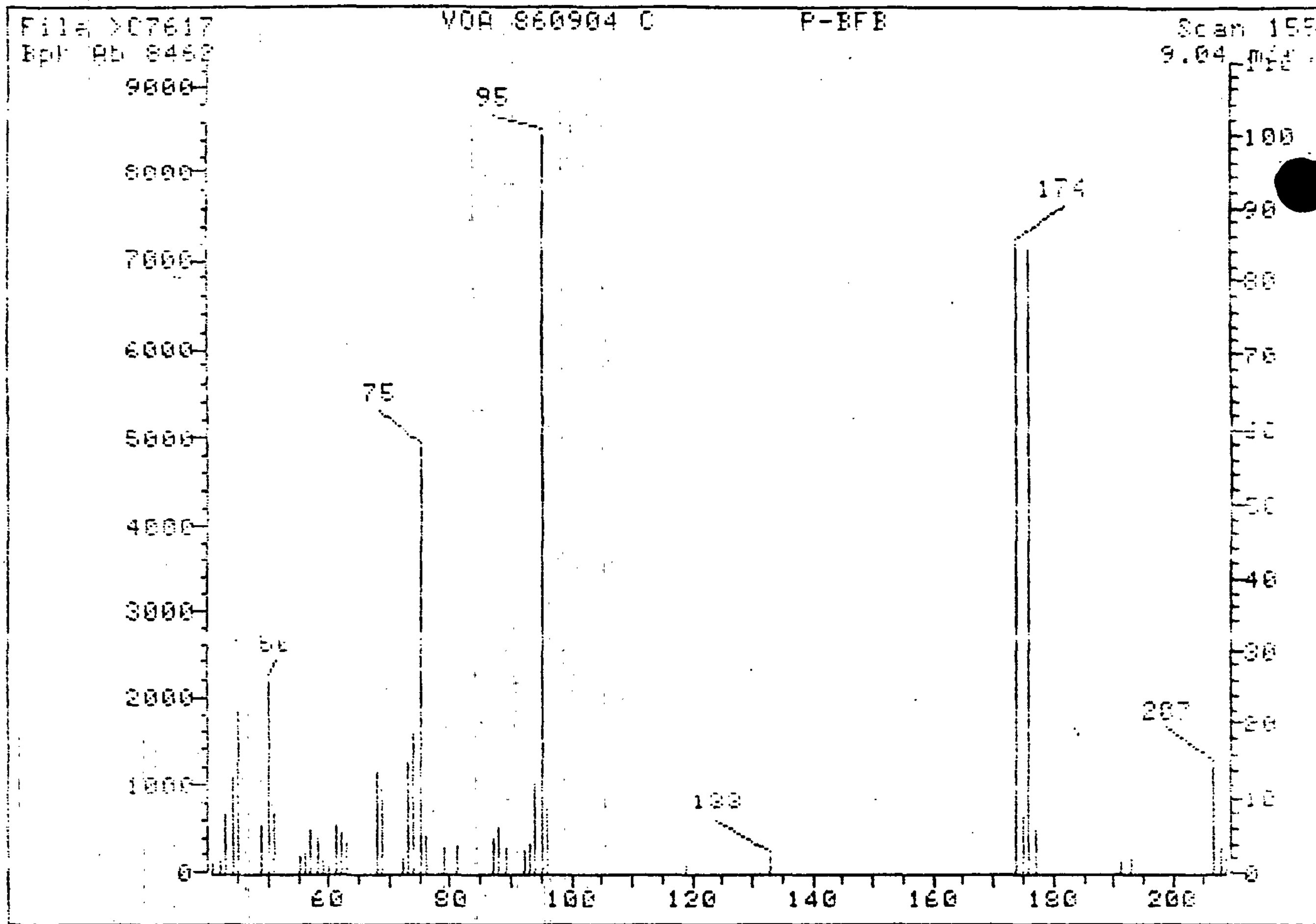


TABLE 2: METHOD PERFORMANCE DATA (QR21)

GC/MS Tuning Data - Bromofluorobenzene (BFB) for Volatiles Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	25.02	25.02	Ok
75	30-60% of mass 95	57.54	57.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.33	8.33	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	84.89	84.89	Ok
175	5-9% of mass 174	7.41	8.73	Ok
176	95-101% of mass 174	84.85	99.96	Ok
177	5-9% of mass 176	5.72	6.74	Ok

Injection Date: 09/04/86 Analyst: [illegible]
Injection Time: 03:16 Processor: [illegible]
Run No: >C7617 QC Batch: QVS474
Spectrum No: 155 Samples: N4742, N4744, N4746, N4745, N1590, N1591, N4343, N4344, N4102, N4777, N4778, N4775, N4779, N4780, N4776, N4180

E.R. 9/6/86

Appendix 22

REI 3-3 Pumping Test Data Sheets

FRENCH LTD REI 7-4
(Run 2)
08/21/87

SE2000B DATA
constant rate test

TRANSDUCER TABLE

```
Input 1: REI 7-[illegible]
  Transducer s/n: 139
  Scale factor:    49.59
  Initial level:   81.69 feet

Input 2: REI 11
  Transducer s/n: 185[illegible]/858
  Scale factor:    50.4
  Initial level:   79.28 feet

Input 3: REI 7
  Transducer s/n: 1999/850
  Scale factor:    10.08
  Initial level:   81.17 feet

Input 4: REI 10-1
  Transducer s/n: 1917/859
  Scale factor:    10.09
  Initial level:   81.18 feet

Input 5: REI 3-1
  Transducer s/n: 1362/851
  Scale factor:    10.02
  Initial level:   6.29 feet

Input 6: REI 3-2
  Transducer s/n: 774/844
  Scale factor:    10.05
  Initial level:   5.87 feet

Input 7: REI 3-3
  Transducer s/n: 1518/854
  Scale factor:    10.08
  Initial level:   7.32 feet
```

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF ____

PROJECT: French Ltd. JOB NO.: 225-14

SUBJECT: FLOW RATE MONITORING SHEET REI 3-3C (pumping)

COMPUTED BY: ____ DATE: ____

CHECKED BY: ____ DATE: ____

may be as much as 3.4 ?

D. Donovan + Avi Taylor take shift

FLOW RATE	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
Variable			3.0	00:27	DRG
3	18:31	RK	3.0	00:32	RK
2.9	18:35	RK	3.0	00:51	DRG
3	18.42	RK	3.0	[illegible]:11	D.D
3	18.55	RK	3.0	02:04	D.D
3	19.05	RK	3.0	03:10	A.T.
3	19.11	RK	3.0	03:50	A.T.
3.2	19.24	RK	3.0	04:00	D.D
3.0	19:27	PCM	3.0	05:00	A.T.
3.0	19.30	RK	3.0	06:00	A.T.
3.0	19:42	DRG	3.0	06:51	A.T.
3.0	19.47	RK	3.0	07:00	DD
3.0	19.57	RK	3.0	07:15	A.T
3.0	20.23	RK	3.0	09:01	PCM
3.0	20.29	RK			
3.0	20.41	RK			
3.0	20.51	RK			
3.0	20.59	RK			
3.0	21.11	DRG			
3.0	21:25	DRG			
3.0	21.32	RK			
3.0	21:54	DRG			
3.0	22:32	DRG			
3.0	23:03	RK			
3.0	23.15	RK			
3.0	23:36	DRG			
3.0	23:45	RK			
3.0	23:58	RK			

REI

PUMP TEST DATA SHEET FOR REI 3-3 shallow SHEET 1 OF 4

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: REI 3-3 (pumping)
r IN FEET: .166
STARTING WATER LEVEL: 7.22

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
18:30	0	7.22	pcm		
	.5	8.27	pcm	1.05	1.26×10^{-2}
18:31	1	9.15	pcm	1.93	2.52×10^{-2}
	1.5	9.19	pcm	1.97	3.77×10^{-2} (8)
18:32:00	2	9.28	pcm	2.06	5.05×10^{-2} (4)
	2.5	9.39	pcm	2.17	6.29×10^{-2} (30)
18:33:00	3	9.48	pcm	2.26	7.58×10^{-2} (6)
	3.5	9.58	pcm	2.36	8.85×10^{-2} (2)
18:34	4	9.68	pcm	2.46	1.01×10^{-1}
	4.5	9.72	pcm	2.50	1.13×10^{-1}
18:35	5	9.77	pcm	2.55	1.26×10^{-1}
18:36	6	9.92	pcm	2.70	1.51×10^{-1}
18:37	7	10.02	pcm	2.80	1.76×10^{-1}
18:38	8	10.13	pcm	2.91	2.02×10^{-1}
18:39	9	10.21	pcm	2.99	2.27×10^{-1}
18:40	10	10.28	pcm	3.06	2.52×10^{-1}
18:42	12	10.41	pcm	3.19	3.02×10^{-1}
18:44	14	10.51	pcm	3.29	3.53×10^{-1}
18:46	16	10.60	pcm	3.38	4.03×10^{-1}
18:48	18	10.68	pcm	3.46	4.55×10^{-1} (4)
18:50	20	10.74	pcm	3.52	5.05×10^{-1} (4)
18:52	22	10.78	pcm	3.56	5.56×10^{-1} (4)

Calculated By R Kszalka   Checked by D. Romer

REI

PUMP TEST DATA SHEET FOR REI 3-3(shallow) SHEET 2 OF 4

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: REI-3-3 (pumping)
r IN FEET: .166
STARTING WATER LEVEL: 7.22

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
18:54	24	10.86	PCM	3.64	6.06×10^{-1}
18:56	26	10.91	PCM	3.69	6.54×10^{-1}
18:58	28	10.98	PCM	3.76	7.04×10^{-1}
19:00	30	11.02	PCM	3.80	7.58×10^{-1}
19:02	32	11.06	PCM	3.84	8.06×10^{-1}
19:04	34	11.12	PCM	3.90	8.55×10^{-1}
19:06	36	11.15	PCM	3.93	9.09×10^{-1}
19:08	38	11.17	PCM	3.95	9.62×10^{-1}
19:10	40	11.20	PCM	3.98	1.01×10^{0}
19:12	42	11.24	PCM	4.02	1.06×10^{0}
19:14	44	11.26	PCM	4.04	1.11×10^{0}
19:16	46	11.29	PCM	4.07	1.16×10^{0}
19:18	48	11.34	PCM	4.12	1.21×10^{0}
19:20	50	11.35	DRG	4.13	1.26×10^{0}
19:22	52	11.37	DRG	4.15	1.31×10^{0}
19:24	54	11.39	PCM	4.17	1.36×10^{0}
19:26	56	10.87	PMC	3.65	1.41×10^{0}
19:28	58	10.72	PMC	3.50	1.54×10^{0}
19:30	60	10.65	PCM	3.43	1.51×10^{0}
19:35	65	10.50	RK	3.28	1.64×10^{0}
19:40	70	10.44	RK	3.22	1.76×10^{0}
19:45	75	10.41	RK	3.19	1.89×10^{0}
19:50	80	10.39	RK	3.17	2.02×10^{0}
19:55	85	10.37	RK	3.15	2.14×10^{0}
20:00	90	10.37	RK	3.15	2.27×10^{0}
~~20:05~~	~~95~~ RK				

Calculated by R Kroske   Checked by D. Losson

REI

PUMP TEST DATA SHEET FOR REI 3-3 shallow SHEET 3 OF 4

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 8-11-86 /8/12/86

WELL NUMBER: REI 3-3 (pumping)
r IN FEET: .166
STARTING WATER LEVEL: 7.22

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
20.10	100	10.35	RK	3.13	2.52 X 10°
20.20	110	10.35	RK	3.13	2.77 X 10°
20.30	120	10.40	RK	3.18	3.02 X 10°
20.40	130	10.425	RK	3.21	3.28 X 10°
20.50	140	10.44	RK	3.22	3.53 X 10°
21.00	150	10.45	RK	3.23	3.77 X 10°
21 10	160	10.44	RK	3.22	4.03 X 10°
21.20	170	10.44	RK	3.22	4.29 X 10°
21.30	180	10.445	RK	3.23	4.55 X 10°
21.50	200	10.44	RK	3.22	5.05 X 10°
22.10	220	10.44	RK	3.22	5.56 X 10°
22.30	240	10.425	RK	3.21	6.06 X 10°
23.00	270	10.45	ok ~~RK~~	3.23	6.80 X 10°
23:30	300	10.46	ok ~~RK~~	3.24	7.58 X 10°
24:00	330	10.485	ok ~~RK~~	3.27	8.33 X 10°
01:00	390	10.51	ok ~~RK~~	3.29	9.80 X 10°
02:00	450	10.52	DD	3.30	1.13 X 10'
03:00	510	10.54	D.D	3.32	1.29 X 10'
04:00	570	10.54	DD	3.30	1.44 X 10'
05:00	630	10.57	D.D	3.35	1.59 X 10'
06:00	690	10.50	D.D	3.28	1.74 X 10'
07:00	750	10.48	D.D	3.26	1.89 X 10'
0800	~~870~~ 810 DEG	10.55	D.D	3.33	2.04 X 10' DEG ~~2.07 X 10'~~
0900	~~880~~ 870 DEG	10.54	D.D	3.32	2.19 X 10' DEG ~~2.22 X 10'~~
0914	~~894~~ 884 DEG	10.54	GCM	3.32	2.23 X 10' DEG ~~2.25 X 10'~~
0915	went	to recovery			

D. Dorrance A. Taylor take shift

mid

Adjustment made to flowmeter

calculated by Ari Taylor. checked by D. Dorrance

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: FRENCH
PROJECT NUMBER: 275-14
DATE: 8/12/86

WELL NUMBER: REI 3-3 (PUMPING)
r IN FEET: 0.166
STARTING WATER LEVEL: 7.22
STOPPING WATER LEVEL: 10.54

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
0915	885 (0)	10.54					
	0.5	10.015		0.52	1.26 E-2	2.80	1.77 E+3
	1	9.79		0.75	2.52 E-2	2.57	8.86 E+2
	1.5	9.56		0.98	3.78 E-2	2.34	5.91 E+2
	2	9.45		1.09	5.04 E-2	2.23	4.44 E+2
	2.5	9.345		1.19	6.30 E-2	2.13	3.55 E+2
	3	9.24		1.30	7.56 E-2	2.02	2.96 E+2
	3.5	9.17		1.37	8.82 E-2	1.95	2.54 E+2
	4	9.10		1.44	1.01 E-1	1.88	2.22 E+2
	4.5	9.045		1.49	1.13 E-1	1.83	1.98 E+2
	5	8.995		1.54	1.26 E-1	1.78	1.78 E+2
	5.5	8.94		1.60	1.39 E-1	1.72	1.62 E+2
	6	8.885		1.65	1.51 E-1	1.67	1.49 E+2
	7	8.825		1.71	1.76 E-1	1.61	1.27 E+2
	8	8.74		1.80	2.02 E-1	1.52	1.12 E+2
	9	8.68		1.86	2.27 E-1	1.46	9.93 E+1
	10	8.625		1.91	2.52 E-1	1.41	8.95 E+1
	12	8.54		2.00	3.02 E-1	1.32	7.48 E+1
	14	8.46		2.08	3.53 E-1	1.24	6.42 E+1
0930	15	8.425		2.11	3.78 E-1	1.21	6.00 E+1
	17	8.38		2.16	4.28 E-1	1.16	5.31 E+1
	19	8.32		2.22	4.79 E-1	1.10	4.76 E+1
	20	8.305		2.23	5.04 E-1	1.09	4.53 E+1
	25	8.20		2.34	6.30 E-1	0.98	3.64 E+1
0945	30	8.14		2.40	7.56 E-1	0.92	3.05 E+1

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW SHEET 1 OF 5

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: REI3-5 Observation
r IN FEET: 39.33'
STARTING WATER LEVEL: 5.18'

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
1740		5.17	BMB		
6:30 1830	0	5.18			
1831	1	5.18		0.00	4.48×10^{-7}
1832	2	5.18		0.00	9.01×10^{-7}
1833	3	5.18		0.00	1.35×10^{-6}
1834	4	5.20		0.02	1.80×10^{-6}
1835	5	5.22		0.04	2.25×10^{-6}
1836	6	5.24		0.06	2.70×10^{-6}
1837	7	5.26		0.08	3.14×10^{-6}
1838	8	5.28		0.10	3.60×10^{-6}
1839	9	5.31		0.13	4.05×10^{-6}
1840	10	5.33		0.15	4.48×10^{-6}
1841	11	5.36		0.18	4.95×10^{-6}
1842	12	5.38		0.20	5.38×10^{-6}
1843	13	5.40		0.22	5.85×10^{-6}
1844	14	5.42		0.24	6.29×10^{-6}
1845	15	5.44		0.26	6.76×10^{-6}
1846	16	5.46		0.28	7.19×10^{-6}
1848	18	5.50		0.32	8.06×10^{-6}
1850	20	5.54		0.36	9.01×10^{-6}
1852	22	5.58		0.40	9.90×10^{-6}
1854	24	5.61		0.43	1.08×10^{-5}
1856	26	5.65		0.47	1.17×10^{-5}

Calculated by D Rosson   Checked by K Kracko

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: French
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: REI #3-5
r IN FEET: 39.33
STARTING WATER LEVEL: 5.18'

	CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
	1858	28	5.69	BMB	0.51	1.26×10^{-5}
7:00	1800	30	5.71		0.53	1.35×10^{-5}
	1805	35	5.78		0.60	1.57×10^{-5}
	1910	40	5.85		0.67	1.80×10^{-5}
	1915	45	5.90		0.72	2.02×10^{-5}
	1920	50	5.95		0.77	$2.2^{4}5 \times 10^{-5}$
	1925	55	5.99		0.81	2.47×10^{-5}
7:30	1930	60	6.02		0.84	$2.70^{69} \times 10^{-5}$
	1936	66	6.02	Rk	0.84	$2.97^{6} \times 10^{-5}$
	1941	71	6.015	Rk	0.84	$3.18^{9} \times 10^{-5}$
	1946	76	6.01	Rk	0.83	3.41×10^{-5}
	1951	81	6.01	Rk	0.83	3.64×10^{-5}
	1956	86	6.015	Rk	0.84	3.86×10^{-5}
8:01	2001	91	6.015	Rk	0.84	$4.08^{9} \times 10^{-5}$
	~~2006~~	~~96~~ Rk		~~Rk~~		
	2011	101	6.02	Rk	0.84	$4.52^{3} \times 10^{-5}$
	~~2016~~	~~106~~ Rk				
	2021	111	6.03	Rk	0.85	4.98×10^{-5}
	~~2026~~	~~116~~ R				
	2031	121	6.04	Rk	0.86	5.43×10^{-5}
	2041	131	6.05	Rk	0.87	5.88×10^{-5}
	2051	141	6.06	Rk	0.88	6.33×10^{-5}
9.01	2101	151	6.07	Rk	0.89	$6.76^{8} \times 10^{-5}$
	2111	161	6.08	Rk	0.90	$7.25^{3} \times 10^{-5}$
	21.21	171	6.085	Rk	0.91	$7.69^{8} \times 10^{-5}$
	21.31	181	6.095	Rk	0.92	8.13×10^{-5}

Calculated by D. Rasson Checked by R Krook

REI

h

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW SHEET 3 OF 5

PROJECT NAME: French Ltd.
PROJECT NUMBER: 275-14
DATE: 8-11-86/8-12-86

WELL NUMBER: REI 3-5
r IN FEET: 39.33'
STARTING WATER LEVEL: 5.18

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
2151	201	6.11	RK	0.93	$9.0\overset{2}{1} \times 10^{-5}$
2211	221	6.115	RK	0.94	$9.9\overset{2}{0} \times 10^{-5}$
2231	241	6.12	DRG	0.94	1.08×10^{-4}
2301	271	6.13	DRG	0.95	1.22×10^{-4}
2331	301	6.15	DRG	0.97	1.35×10^{-4}
mid DRG 0001	331	6.16	DRG	0.98	1.49×10^{-4}
0101	391	6.18	DRG	1.00	$1.7\overset{6}{5} \times 10^{-4}$
02:01	451	6.195	D.D	1.02	2.02×10^{-4}
03:02	512	6.21	D.D	1.03	2.30×10^{-4}
04:02	572	6.215	A.T.	1.035	2.57×10^{-4}
05:01	631	6.22	D.D	1.04	2.83×10^{-4}
06:01	691	6.23	D.D	1.05	$3.1\overset{0}{1} \times 10^{-4}$
07:02	761 DRG 752	6.23	A.T.	1.05	DRG 3.38×10^{-4} ~~$3.4\overset{2}{1} \times 10^{-4}$~~
08:01	~~821~~ DRG 811	6.24	D.D	1.06	DRG 3.64×10^{-4} ~~3.69×10^{-4}~~
09:01	~~881~~ DRG 871	6.245	D.D	1.07	3.91×10^{-4} DRG ~~$3.9\overset{6}{5} \times 10^{-4}$~~
09:14	~~894~~ DRG 884	6.25		1.07	3.97×10^{-4} DRG ~~4.02×10^{-4}~~

D. Dorrance - D. Taylor take shift.

adjustment made to flow meter.

Calculated by D. Taylor. Checked by D. Dorrance

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: FRENCH
PROJECT NUMBER: 275-14
DATE: 8/12/86
* RECOVERY BEGUN

WELL NUMBER: REI 3-5 OBSERV
r IN FEET: 39.33'
STARTING WATER LEVEL: 5.18'
STOPPING WATER LEVEL: 6.25'

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
9:14	884	6.25					
*9:15	885 (0)	6.25					
9:16	1	6.25		0.00	4.49 E-7	-1.07	8.86 E+2
9:17	2	6.24		0.00	8.98 E-7	1.07	4.44 E+2
9:18	3	6.24		+ 0.01	1.35 E-6	1.06	2.96 E+2
9:19	4	6.24		0.01	1.80 E-6	1.06	2.22 E+2
9:20	5	6.23		0.02	2.24 E-6	1.05	1.78 E+2
9:21	6	6.22		0.03	2.70 E-6	1.04	1.49 E+2
9:22	7	6.21		0.04	3.14 E-6	1.03	1.27 E+2
9:23	8	6.20		0.05	3.59 E-6	1.02	1.12 E+2
9:24	9	6.19		0.06	4.04 E-6	1.01	9.93 E+1
9:25	10	6.18		0.07	4.49 E-6	1.00	8.95 E+1
9:26	11	6.17		0.08	4.94 E-6	0.99	8.15 E+1
9:27	12	6.16		0.09	5.39 E-6	0.98	7.48 E+1
9:28	13	6.14		0.11 ~~0.04~~	5.84 E-6	0.96	6.91 E+1
9:29	14	6.13		0.12	6.29 E-6	0.95	6.42 E+1
9:30	15	6.12		0.13	6.73 E-6	0.94	6.00 E+1
9:31	16	6.11		0.14	7.18 E-6	0.93	5.63 E+1
9:32	17	6.09		0.16	7.63 E-6	0.91	5.31 E+1
9:33	18	6.08		0.17	8.08 E-6	0.90	5.02 E+1
9:34	19	6.07		0.18	8.53 E-6	0.89	4.76 E+1
9:35	20	6.06		0.19	8.98 E-6	0.88	4.53 E+1
9:36	21	6.05		0.20	9.43 E-6	0.87	4.31 E+1
9:37	22	6.04		0.21	9.88 E-6	0.86	4.12 E+1
9:38	23	6.03		0.22	1.03 E-5	0.85	3.95 E+1
9:39	24	6.02		0.23	1.08 E-5	0.84	3.79 E+1

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: FRENCH
PROJECT NUMBER: 275-14
DATE: 8/12/86

WELL NUMBER: REI 3-5
r IN FEET: 39.33
STARTING WATER LEVEL: 5.18

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
9:41	26	6.00		0.25	1.17 E-5	-0.82	3.50 E+1
9:43	28	5.99		0.26	1.26 E-5	0.81	3.26 E+1
9:45	30	5.97		0.28	1.35 E-5	0.79	3.05 E+1
9:47	32	5.95		0.30	1.44 E-5	0.77	2.87 E+1
9:49	34	5.94		~~0.30~~ 0.31	1.53 E-5	0.76	2.70 E+1
9:51	36	5.93		0.32	1.62 E-5	0.75	2.56 E+1
9:53	38	5.92		0.33	1.71 E-5	0.74	2.43 E+1
9:55	40	5.90		0.35	1.80 E-5	0.72	2.31 E+1
9:57	42	5.88		0.37	1.89 E-5	0.70	2.21 E+1
9:59	44	5.86		0.39	1.98 E-5	0.68	2.11 E+1
10:00	45	5.85		0.40	2.02 E-5	0.67	2.07 E+1
10:05	50	5.82		0.43	2.24 E-5	0.64	1.87 E+1
10:10	55	5.78		0.47	2.47 E-5	0.60	1.71 E+1
10:15	60	5.76		0.49	2.69 E-5	0.58	1.58 E+1
10:25	70	5.71		0.54	3.14 E-5	0.53	1.36 E+1
10:35	80	5.67		0.58	3.59 E-5	0.49	1.21 E+1
10:50	95	5.62		0.63	4.26 E-5	0.44	1.03 E+1
11:00	105	5.59		0.66	4.71 E-5	0.41	9.43 E+0
11:30	135	5.53		0.72	6.06 E-5	0.35	7.56 E+0

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW SHEET 1 OF 5

PROJECT NAME: French
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: P3-3 shallow observ
r IN FEET: ~~12'5"~~ 12.42 Deg
STARTING WATER LEVEL: 5.27'

ELAPSED ~~CLOCK TIME~~ (2400)	CLOCK ~~ELAPSED~~ TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
1829					
18:30:00		5.27	RSA		
0.5		5.27	RSA	0.00	2.25 X 10^{-6}
1.0		5.27	RSA	0.00	4.50 X 10^{-6}
1.5		5.275	RSA	0.01	6.7~~6~~5 X 10^{-6}
2.0		5.28	RSA	0.01	9.0~~1~~0 X 10^{-6}
2.5		5.29	RSA	0.02	1.1~~2~~3 X 10^{-5}
3.0		5.30	RSA	0.03	1.35 X 10^{-5}
3.5		5.32	RSA	0.05	1.5~~7~~8 X 10^{-5}
4.0		5.335	RSA	0.07	1.80 X 10^{-5}
4.5		5.35	RSA	0.08	2.0~~2~~3 X 10^{-5}
5.0		5.37	RSA	0.10	2.35 X 10^{-5}
~~5.5~~		~~—~~	RSA		
6.0		5.42	RSA	0.15	2.70 X 10^{-5}
7.0		5.46	RSA	0.19	3.15 X 10^{-5}
8.0		5.505	RSA	0.24	3.60 X 10^{-5}
9.0		5.56	RSA	0.29	4.05 X 10^{-5}
10.0		5.605	RSA	0.34	4.50 X 10^{-5}
12.0		5.71	RSA	0.44	5.4~~1~~0 X 10^{-5}
14.0		5.815	RSA	0.55	~~6.29~~ 6.30 X 10^{-5}
16.0		5.92	RSA	0.65	~~7.19~~ 7.20 X 10^{-5}
18.0		6.025	RSA	0.76	8.1~~3~~0 X 10^{-5}
20.0		6.12	RSA	0.85	9.0~~1~~0 X 10^{-5}
22.0		6.215	RSA	0.95	9.90 X 10^{-5}
24.0		6.305	RSA	1.04	1.08 X 10^{-4}

Calculated by D. Rosson Checked by R K[illegible]

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW SHEET 2 OF 5

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 8-11-86

WELL NUMBER: P3-3 shallow observ.
r IN FEET: 12'5"
STARTING WATER LEVEL: 5.27'

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r^2
18:56	26.0	6.395	RSA ✓	1.13	1.17×10^{-4}
18:58	28.0	6.47	RSA ✓	1.20	1.26×10^{-4}
19:00	30.0	6.55	RSA	1.28	1.35×10^{-4}
19:02	32.0	6.62	RSA ✓	1.35	1.44×10^{-4}
19:04	34.0	6.69	RSA	1.42	1.53×10^{-4}
19:06	36.0	6.75	RSA ✓	1.48	1.62×10^{-4}
19:08	38.0	6.805	RSA	1.54	1.71×10^{-4}
19:10	40.0	6.86	RSA ✓	1.59	1.80×10^{-4}
19:12	42.0	6.91	RSA	1.64	1.89×10^{-4}
19:14	44.0	6.95	RSA ✓	1.68	1.98×10^{-4}
19:16	46.0	7.00	RSA	1.73	2.07×10^{-4}
19:18	48.0	7.03	RSA ✓	1.76	2.16×10^{-4}
19:20	50.0	7.07	RSA	1.80	2.25×10^{-4}
19:22	52.0	7.10	RSA ✓	1.83	2.34×10^{-4}
19:24	54.0	7.13	RSA	1.86	2.43×10^{-4}
19:26	56.0	7.16	RSA	1.89	2.52×10^{-4}
19:28	58.0	7.17	RSA	1.90	2.61×10^{-4}
19:30	60.0	7.17	RK ✓	1.90	2.70×10^{-4}
19:35	65.0	7.16	DRG	1.89	$2.9\overset{3}{2} \times 10^{-4}$
19:40	70.0	7.135	DRG	1.87	3.15×10^{-4}
19:45	75.0	7.10	DRG	1.83	3.38×10^{-4}
19:50	80.0	7.08	DRG ✓	1.81	3.60×10^{-4}
19:55	85.0	7.055	DRG	1.79	3.83×10^{-4}
20:00	90.0	7.045	DRG	1.78	4.05×10^{-4}
20:10	100.0	7.025	DRG	1.76	4.50×10^{-4}
20:20	110.0	7.02	DRG ✓	1.75	4.95×10^{-4}

Calculated by D. Rosson checked by R Kroski

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW SHEET 3 OF 5

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 8-11-86/8-12-86

WELL NUMBER: P3-3 shallow obs.
r IN FEET: ~~12'5"~~ 12.42 Dec
STARTING WATER LEVEL: 5.27

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	t/r²
20:30	120.0	7.015	DRG	1.75	$5.4\overset{0}{9}\times10^{-4}$
20:40	130.0	7.035	DRG	1.77	5.85×10^{-4}
20:50	140.0	7.05	DRG	1.78	$6.\overset{3}{2}\overset{0}{9}\times10^{-4}$
21:00	150.0	7.07	DRG	1.80	$6.7\overset{5}{6}\times10^{-4}$
21:10	160.0	7.08	DRG	1.81	$7.\overset{2}{1}\overset{0}{9}\times10^{-4}$
21:20	170.0	7.09	DRG	1.82	$7.6\overset{5}{3}\times10^{-4}$
21:30	180.0	7.105	DRG	1.84	$8.1\overset{0}{3}\times10^{-4}$
21:50	200.0	7.11	DRG	1.84	$9.0\overset{0}{1}\times10^{-4}$
22:10	220.0	7.09	DRG	1.82	9.90×10^{-4}
22:30	240.0	7.08	DRG	1.81	1.08×10^{-3}
23:00	270.0	7.07	DRG	1.80	1.22×10^{-3}
23:30	300.0	7.085	DRG	1.82	1.35×10^{-3}
24:00	330.0	7.11	DRG	1.84	1.49×10^{-3}
01:00	390.0	7.19	DRG	1.92	$1.7\overset{6}{5}\times10^{-3}$
02:00	450.0	7.215	A.T.	1.95	$2.0\overset{3}{2}\times10^{-3}$
03:00	510.0	7.210	A.T.	1.94	$2.\overset{3}{2}\overset{0}{9}\times10^{-3}$
04:00	570.0	7.235	A.T.	1.97	$2.5\overset{7}{6}\times10^{-3}$
05:00	630	7.230	A.T.	1.96	$2.8\overset{4}{3}\times10^{-3}$
06:00	690	7.230	A.T.	1.96	3.11×10^{-3}
07:00	D.D 11-24-86 ~~760~~ 750	7.150	A.T.	1.88	3.37×10^{-3} DD 11-24-86 ~~3.42×10^{-3}~~
08:00	D.D 11-24-86 ~~820~~ 810	7.25	A.T.	1.98	3.65×10^{-3} ~~3.69×10^{-3}~~
09:00	D.D 11-24-86 ~~880~~ 870	7.25	A.T.	1.98	3.92×10^{-3} ~~$3.9\overset{6}{7}\times10^{-3}$~~

D.Donovan + A.Tayer take shift

Adjustment → made to flow meter

calculated by Ari Tayer checked by D.Donovan

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: FRENCH
PROJECT NUMBER: 275-14
DATE: 8/12/86

WELL NUMBER: P3-3 SHALLOW OBSERV
r IN FEET: 12.42
STARTING WATER LEVEL: 5.27
STOPPING WATER LEVEL: 7.25

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
0914	894	7.25					
0915	895 0	7.25					
	3.5	7.25	o.	0.00	1.58 E-5	- 1.98	2.54×10^2
	4.5	7.235		0.02	2.03 E-5	1.97	1.98×10^2
	5.5	7.21		0.04	2.48 E-5	1.94	1.62×10^2
	6	7.20		0.05	2.70 E-5	1.93	1.48×10^2
	7	7.17		0.08	3.15 E-5	1.90	1.27×10^2
	8	7.14		0.11	3.60 E-5	1.87	1.12×10^2
	10	7.075		0.17	4.50 E-5	1.81	8.95×10^1
	12	7.025		0.22	5.40 E-5	1.76	7.48×10^1
	14	6.95		0.30	6.30 E-5	1.68	6.42×10^1
	15	6.92		0.33	6.75 E-5	1.65	6.00×10^1
	17	6.865		0.38	7.65 E-5	1.60	5.31×10^1
	19	6.81		0.44	8.55 E-5	1.54	4.[illegible] $\times 10^1$
	20	6.775		0.47	9.00 E-5	1.51	4.53×10^1
	25	6.64		0.61	1.13 E-4	1.37	3.64×10^1
	30	6.525		0.72	1.35 E-4	1.26	3.05×10^1
	35	6.415		0.83	1.58 E-4	1.15	2.63×10^1
	40	6.33		0.92	1.80 E-4	1.06	2.31×10^1
	45	6.25		1.00	2.03 E-4	0.98	2.07×10^1
	50	6.185		1.06	2.25 E-4	0.92	1.87×10^1
	55	6.125		1.12	2.48 E-4	0.86	1.71×10^1
	60	6.070		1.18	2.70 E-4	0.80	1.58×10^1
	65	6.020		1.23	2.93 E-4	0.75	1.46×10^1
	71	5.97		1.28	3.20 E-4	0.70	1.35×10^1

REI

PUMP TEST DATA SHEET FOR REI 3-3 SHALLOW

PROJECT NAME: FRENCH
PROJECT NUMBER: 275-14
DATE: 8/12/86

WELL NUMBER: SHALLOW OBSERV
r IN FEET: 12.42
STARTING WATER LEVEL: 5.27

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	t/r^2	ΔH (RESIDUAL DRAWDOWN)	t/t'
	81	5.905		1.34	3.65 E-4	0.64	1.19×10^1
1051	96	5.835		1.41	4.32 E-4	0.57	1.02×10^1
1101	106	5.77		1.48	4.77 E-4	0.50	9.35
1131	136	5.70		1.55	6.12 E-4	0.43	7.51

REI

Appendix 23

REI 10-1 and REI 12-1 Well
Drawdown Test Data

PUMP TEST DATA SHEET FOR Recovery SHEET 1 OF

PROJECT NAME: FRENCH LIMITED
PROJECT NUMBER:
DATE: 8-16-86

WELL NUMBER: GW-25
r IN FEET: 67.7'
STARTING WATER LEVEL: 82.52

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	r^2/T
0920	—	82.52	MJD	0	
1030	Pump On 0				
1054	24	83.71	"	1.19	
1055	25	83.73		1.21	
1101	31	83.83		1.31	
1107	37	83.91		1.39	
1110	40	83.94		1.42	
1120	50	84.04		1.52	
1126	56	84.10		1.58	
1137	67	84.16		1.64	
1140	70	84.21		1.69	
pump off 12:00					
12:01		84.31			
12:02		84.27			
12:02:30		84.22			
12:03		84.15			
12:0330		84.09			
12:04:00		84.04			
12:04:30		83:98			
12:05.04		83:95			
12:06		83:85			
12:07		83.79			
12:08		83.72			
12:09		83.68			
12:10					

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: ____________
PROJECT NUMBER: ____________
DATE: ____________

WELL NUMBER: ____________
r IN FEET: ____________
STARTING WATER LEVEL: ____________

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	r^2/T
12:10		83.63			
12:11		83.60			
12:12		83.56			
12:13		83.53			
12:14		83.50			
12:16		83.45			
12:18		83.41			
12:20		83.37			
12:22		83.35			
12:25		83.30			
12:30		83.25			
12:35		83.215			
12:40		83.17			
12:45		83.15			

REI

Preliminary PUMP TEST DATA SHEET FOR REI-10-1 SHEET___ OF___

PROJECT NAME: French Ltd
PROJECT NUMBER: 275-14
DATE: 8-16-86

WELL NUMBER: REI-10-1
r IN FEET: .166
STARTING WATER LEVEL: ______

8 gpm

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	r^2/T
8:40	—	81.03	RK		
9:59	—	81.05	A.B.		
10:28		81.03	P.M.		
10:30	0	81.03			
	0:45	88.50		7.47	5.29 X 10'
	1:30	89.70		8.67	2.65 X 10'
	2:00	90.44		9.41	1.98 X 10'
	2:30	91.02		9.99	1.59 X 10'
	3:00	missed			
	3:30	91.67		10.64	1.13 X 10'
	4:00	91.89		10.86	9.92 X 10⁰
	4:30	92.05		11.02	8.82 X 10⁰
	5:00	92.20		11.17	7.94 X 10⁰
	5:30	92.33		11.30	7.21 X 10⁰
1 min. interval	6:00	92.51		11.48	6.61 X 10⁰
	7:00	92.83		11.80	5.67 X 10⁰
	8:00	92.98		11.95	4.96 X 10⁰
	9:00	93.11		12.08	4.41 X 10⁰
	10:00	93.20		12.17	3.97 X 10⁰
	11:00	93.27		12.24	3.61 X 10⁰
	12:00	93.35		12.32	3.31 X 10⁰
	13:00	93.41		12.38	3.05 X 10⁰
	14:00	93.45		12.42	2.83 X 10⁰
2 min. interval	16:00	93.53		12.50	2.48 X 10⁰
	18:00	93.61		12.58	2.20 X 10⁰
	20:00	93.69		12.66	1.98 X 10⁰

REI

PUMP TEST DATA SHEET FOR ____________ SHEET ___ OF ___

PROJECT NAME: ____________
PROJECT NUMBER: ____________
DATE: ____________

WELL NUMBER: ____________
r IN FEET: ____________
STARTING WATER LEVEL: ____________

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVERS INITIALS	Δ H	r^2/T
5 min. interval	25:00	93.80		12.77	1.59×10^{0}
	30:00	93.90		12.87	1.32×10^{0}
10 min. interval	40:00	94.05		13.02	9.92×10^{-1}
	50:00	94.18		13.15	7.94×10^{-1}
	60:00	94.32		13.29	6.61×10^{-1}
	75:00	94.46		13.43	5.29×10^{-1}
	89:00	94.58		13.55	4.46×10^{-1}
	90:00				

REI

preliminary PUMP TEST DATA SHEET FOR REI 10-1 recovery SHEET ___ OF ___

PROJECT NAME: ______
PROJECT NUMBER: ______
DATE: ______

WELL NUMBER: REI 10-1
r IN FEET: ______
STARTING WATER LEVEL: ______

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	H RECOVERY	R^2/T	ΔH (RESIDUAL DRAWDOWN)	T/T'
	.30	89.71		4.87	7.94x10¹	8.68	1.81x10²
	1.00	86.95		7.63	3.97x10¹	5.92	9.10x10¹
	1.30	85.10		9.48	2.65x10¹	4.07	6.10x10
	2.00	84.16		10.42	1.98x10¹	3.13	4.60x10
	2.30	83.50		11.08	1.59x10¹	2.47	3.70x10¹
	3.00	83.15		11.43	1.32x10¹	2.12	3.10x10¹
	3.30	82.89		11.69	1.13x10¹	1.86	2.67x10¹
	4.00	82.72		11.86	9.92x10⁰	1.69	2.35x10¹
	4.30	82.53		12.05	8.82x10⁰	1.50	2.10x10¹
	5.00	82.44		12.14	7.94x10⁰	1.41	1.90x10¹
	6.00	82.39		12.19	6.61x10⁰	1.36	1.60x10¹
	7.00	82.32		12.26	5.67x10⁰	1.29	1.39x10¹
	8.00	82.25		12.33	4.96x10⁰	1.22	1.23x10¹
	9.00	82.19		12.39	4.41x10⁰	1.16	1.10x10¹
	10.00	82.14		12.44	3.97x10⁰	1.11	1.00x10¹
	12.00	82.07		12.51	3.31x10⁰	1.04	8.50x10⁰
	15	81.98		12.60	2.65x10⁰	.95	7.00x10⁰
	20	81.89		12.69	1.98x10⁰	.86	5.50x10⁰
	25	81.82		12.76	1.59x10⁰	.79	4.60x10⁰
	30	81.77		12.81	1.32x10⁰	.74	4.00x10⁰
	35	81.73		12.85	1.13x10⁰	.70	3.57x10⁰
	45	81.67		12.91	8.82x10⁻¹	.64	3.60x10

REI

Drawdown Test @ REI 10-1

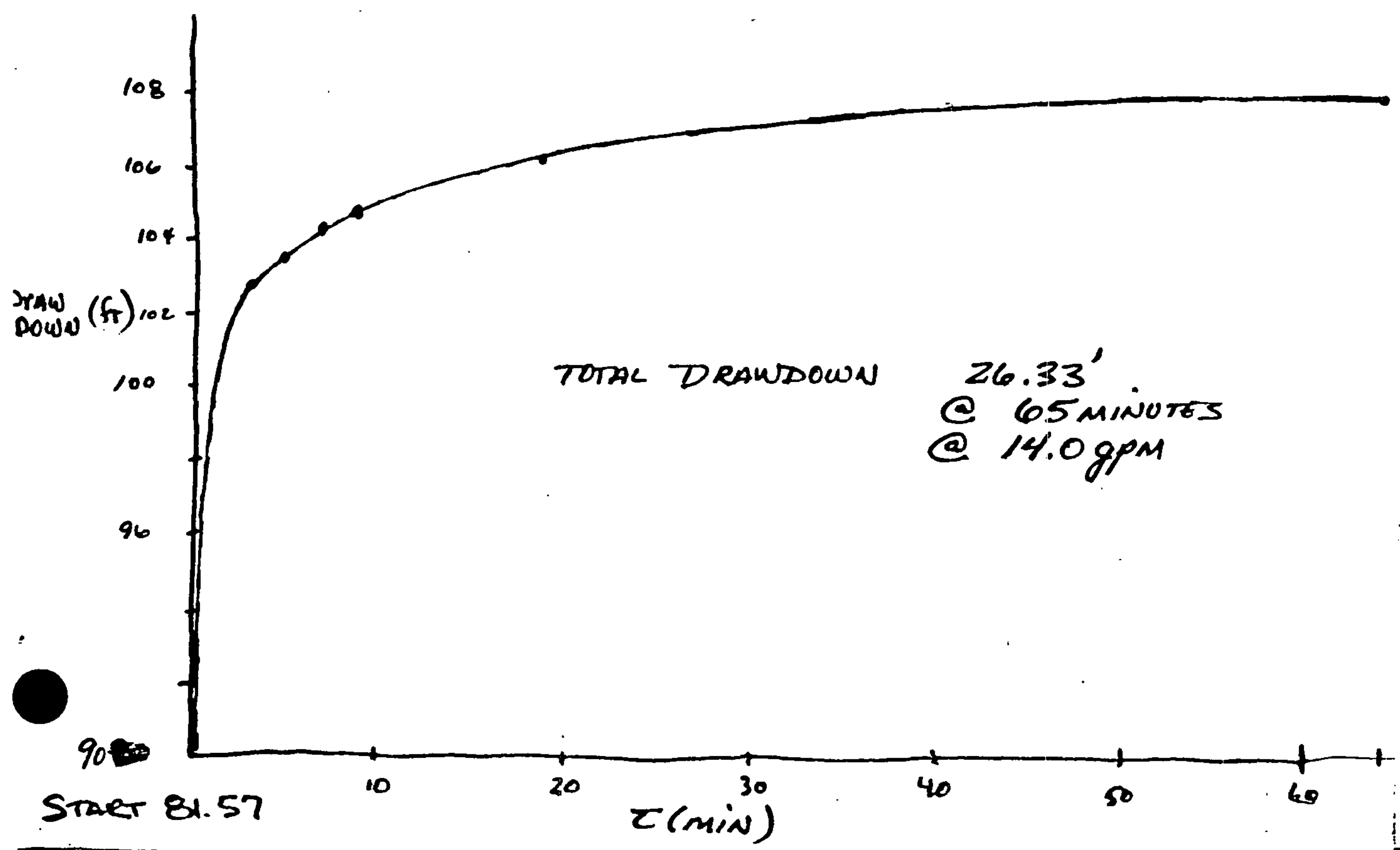
C. Itin
T. Beck

START 6:19:00

81.57'

102.8	6:22:40	FLOW RATE ≃ 14-15 gpm (fluctuating)
103.55	6:24:00	
104.2	6:26:05	
104.6	6:28:09	FLOWRATE = 14.0 gpm
106.1	6:38:20	
107.9	7.24:00	Flowrate 14.0 gpm ±

Pump Set @ 139' from Gr Surface



PUMP TEST DATA SHEET FOR REI-11 SHEET___ OF___

PROJECT NAME:

PROJECT NUMBER:

DATE:

WELL NUMBER: REI-11

r IN FEET: .166

STARTING WATER LEVEL: 64.55

pumping rate 55gpm

CLOCK TIME (2400)	ELAPSED TIME (Min)	DEPTH TO WATER (Feet)	OBSERVER INITIALS	ΔH (RESIDUAL DRAWDOWN)	H RECOVERY	R^2/T	T/T'
	0						
	1	86.19		21.64		3.97×10^{1}	
	1.5	84.57		20.02		2.65×10^{1}	
	2	83.55		19.00		1.98×10^{1}	
	2.5	82.89		18.34		1.59×10^{1}	
	3	82.29		17.74		1.32×10^{1}	
	3.5	81.95		17.40		1.13×10^{1}	
	4	81.66		17.11		9.92×10^{0}	
	4.5	81.42		16.87		8.82×10^{0}	
	5	81.28		16.73		7.94×10^{0}	
	6	81.05		16.50		6.61×10^{0}	
	7	80.90		16.35		5.67×10^{0}	
	8	80.78		16.23		4.96×10^{0}	
	9	80.68		16.13		4.41×10^{0}	
	10	80.61		16.06		3.97×10^{0}	
	12	80.52		15.97		3.31×10^{0}	
	14	80.46		15.91		2.83×10^{0}	
	16	80.40		15.85		2.48×10^{0}	
	20	80.23		15.68		1.98×10^{0}	
	25	80.18		15.63		1.59×10^{0}	
	30	80.11		15.56		1.32×10^{0}	
	40	79.98		15.43		9.92×10^{-1}	
	57.5	78.80		14.25		6.9×10^{-1}	

REI

French LTD 11-1-85

REI. T. Beck, M. Beck, J. Brothers, D. Siegle (ERT)

Purpose: To sample GW-12, GW-25, REI-7, REI 3-4

GW-12

Depth to Water 82.17'

Start pumping @ 10:55 AM flowRate ≅ 5gpm

Water Clear then silty / to Clear at end of test

Time	pH	Conductivity
11:00	10.2	800
11:05	9.55	475
11:08	9.22	420
11:12	8.42	420
11:16	8.65	410
11:20	8.84	410
11:22	8.84	410
11:23	8.84	410

Pumping Stopped

ETC Shuttle K4142 USED

Time
12:55
12:5
12:5
13:0
13:0
13:0
13:0
13:0
13:1
13.1
13:1
13:
13:
13:2
13:
13:
13
13:

GW-2

Depth to Water — 83.77'

ETC# K4140 Priority Pollutants

Start - 12:52

Flow Rate ≟ 4.5 gpm

ORION Research 210 pH, YSI → Conductivity

Time	pH	Conduct umho/	TOC	Temp	Vol
			#1		
12:55	8.55	200			
12:56	8.51	190			
			#2		
12:58	8.44	400		72°F	
13:00	8.43	400			
13:02	8.43	400		72°F	
13:04	8.32	400		73°F	
13:05	8.37	350		72°F	
13:08	8.40	350			
			#3		
13:11	8.40	375		73°F	
13:13	8.40	390			
13:16	8.39	390		72°F	
13:19	8.41	375		72°F	
13:21	8.41	380		72°F	
13:26	8.39	390		71°F	
			#4		
13:29	8.38	390		71	150gal
13:30	8.40	390		72	
13:42	8.41	390	#5	72	200gal
13:46	8.41	395			

10-2-92

REI 3-4

Depth to Water 85.06'

flow Rate 5-6 gpM

ETC Shuttle # K4143

3-3

3-2

3-1

Time	PH	Conductivity	Temp
17:48	11.72	2180	21°C
17:52	11.75	2000	21°C
17 57	11:36	800	21°C
18:04	10:87	500	21°C
		490	21°C
18:11	10.42		
18:22	9.91	417	

MW-07

Depth to Water 83.55'

ETC Shuttle K4141

Pumping @ 16:12

Time	pH	Cond	Temp
	11.25	810	
16:24	11.20	900	22°C
16:28	11.21	900	22°C
16:33	11.15	800	22°C
16:38	11.19	800	22°C
16:45	11.11	750	21°C
16:52	10.91	600	21°C
16:56	11.02	650	21°C
16:60	10:10	450	21°C
17.07	9.47	400	21°C
17:10	9.82	400	21°
17:13	9.58	380	21°C

Barta Electric (Sonny Barta) 424-7435
Century Rental (Dennis Wagner) 449-0575

4.30
76.81

FRENCH LTD 10-2-86

A. Tayar, T. Beck

Conduct "Mini" pumptest at 12-1 cluster
pump installed in well to ~~[illegible]~~' 135

Initial water levels w/pump installed

Time	12-1 (TOC)	12-2 (TOC)		
855	76.81	4.30		
8:58	77.10	4.30		
9:01	77.20	4.30	(AVI)	START TEST
903	81.25	4.29	(ART)	~~[illegible]~~
905	96.60	4.29		~~[illegible]~~ pH 8.69
9:07	102.81	4.29		9.32 pH
9:09	108.72	4.29		9.62
9:12	112.82	4.28		
9:15	116.40	4.29		9.68
9:18	119.8	4.29		WATER STILL EXTREMELY SILTY 9.42pH
9:21		4.28		
9:25	121.25	4.29		10% drop FLOW RATE COULD NOT HOLD ON 4GPM REDUCED TO 3GPM

Time	12-1	12-2	pH
			PH 9.03 / 8.91
9:30	117.70	4.28	flow ADJUSTED TO 3.50gpm
9:36	119.30	4.28	
9:40	120.02	4.28	8.91
945	121.25	4.28	TOP of pump 8.73 42
9.48	120.50		Adjust pump to 3.25
9:50	120.09	4.27	8.82
955	118.68	4.27	8.80
10:00	118.19	4.275	~~88.0~~ 8.80
10:05	117.97	4.27	8.81
10:15	118.22	4.27	8.81
10:20	118.26	4.27	8.83
10:25	118.18	4.275	8.81 Rate 3.25
10:30	118.11	4.27	8.77 Water is completely clear
10:35	117.95	4.27	8.77
10:40	Shut down pump To Lower pump to 135' Flow Rate @ 3.5gpm		
10:50	110.5'	4.27	8.78
10:55	116.25'	4.27	8.79
11:00	119.15	4.275	8.75 3.5gpm
11:05	121.05	4.275	8.76
11:07	Pumping Rate upped to 4.0gpm		
11:10	123.75	4.275	8.76 4.0gpm

~~DRAW~~ WATER LEVEL (FT TOC)

TIME	~~OB~~ 12-1	REI 12-2	COMMENTS
11:15	124.87	4.275	pH 8.75
11:20	~~22~~ NR	4.27	
	Generator out of GAS		
11:30	Generator back up to establish DRAWDOWN		Flow Rate 5.5gpm
11:35	114.20'	4.275	4.5gpm 8.77
11:40	124.70'	4.27'	4.5gpm 8.73
11:45	128.42	4.27	4.5gpm 8.68
11:50	130.70	4.27	4.25gpm 8.70
11:55	130.85	4.265	4.25 8.70
12:05	130.93	4.265	4.25gpm
12:10	130.23	4.265	4.25gpm 8.70
12:15	130.45	4.265	4.25gpm 8.66
12:20	130.50	4.265	4.25gpm 8.63
12:25	130.63	4.265	4.25gpm
12:30	131.78	4.265	@ 4.25gpm
12:32	132.0		
12:33	132.15		4.25gpm
12:34	132:15	4.265	
12:35	132;20		

CALCULATIONS AND COMPUTATIONS SHEET 1 OF 2

PROJECT: FRENCH JOB NO.:

SUBJECT: Step down Test COMPUTED BY: DATE:

CHECKED BY: DATE:

12-1

Rate 2GPM

1418	75.34'	DRG
1432	85.40	SC
1433	86.80	SC
14:33:30	88.2	SC
14:34	88.9	SC
14:34:30	~~88~~89.9	SC
14:35	90.98	SC
14:35:30	91.85	SC
14:36	93.1	SC
14:36:30	—	—
14:37	95.0	SC
14:38	96.3	SC
14:38:30	—	—
14:40:00	99.85	SC
14:40:30	100.45	SC
14:41:00	101.05	SC
14:41:30	101.80	SC
14:42:00	102.55	SC
14:42:30	103.20	SC
14:43:00	103.85	SC
14:44:00	105.10	SC
14:45:00	106.18	SC
14:46:00	107.25	SC
14:47:00	108.15	SC

	14:48:00	109.15	SC
	14:49	110.00	SC
	14:50	110.80	SC
	14:51	111.52	SC
	14:52	112.25	SC
	14:53	112.95	SC
	14:54	113.67	~~SR~~ AT
	14:55	114.37	AT
	14:57	115.70	DR
	14:59	116.65	DR
	15:01	117.63	DR
trouble with flow	15:03	118.10	SC
	15:05	118.64	SC
	15:07	118.34	SC
	15:10	119.35	SC
	15:15	120.29	A.T.
	15:20	120.80	A.T.
	15:30	121.77	A.T.
3GPM	15:36	129.00	A.T.
	15:40	133.25	A.T.
	15:45	Below 136, can't take reading.	
	16:15		

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REI

CALCULATIONS AND COMPUTATIONS

PROJECT: ______ JOB NO.: ______

SUBJECT: ______ COMPUTED BY: ______ DATE: ______

CHECKED BY: ______ DATE: ______

16:15 ~~changed~~ flow rate changed to 2.25 GPM

16:27	135.78'	A.T.
16:35	134.25'	A.T.
16:45	134.36'	A.T.
17:00	134.81	A.T.
17:15	Below 136.	A.T.
17:30	" "	A.T
18:45	" "	A.T

REI

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF 3

PROJECT: FRENCH

JOB NO.: 275-14

SUBJECT: Step draw-down MW-12-1

COMPUTED BY: DATE: 9/11

CHECKED BY: DATE:

Time	Δt min	VOL	Depth ft	ΔH ft	OBS.	Rate GPM	pH
14:30	0	–	75.34'	0	DRC	2	–
14:32	2	–	85.40	10.06	SC	2	–
14:33	3	–	86.80	11.46	SC	2	–
14:33:30	3.5	–	88.20	12.86	SC	2	–
14:34	4	–	88.90	13.56	SC	2	–
14:34:30	4.5	–	89.9	14.56	SC	2	–
14:35	5	–	90.98	15.64	SC	2	–
14:35:30	5.5	–	91.85	16.51	SC	2	–
14:36	6	–	93.10	17.76	SC	2	–
14:37	7	–	95.00	19.66	SC	2	–
14:38	8	–	96.30	20.96	SC	2	–
14:40	10	–	99.85	24.51	SC	2	–
14:40 30	10.5	–	100.45	25.11	SC	2	–
14:41:00	11	–	101.05	25.71	SC	2	–
14:41:30	11.5	–	101.80	26.46	SC	2	–
14:42:00	12	–	102.55	27.21	SC	2	–
14:43:00	13	–	103.20	27.86	SC	2	–
14:44:00	14	–	105.10	29.76	SC	2	–
14:45:00	15	–	106.18	30.84	SC	2	–
14:46:00	16	–	107.25	31.91	SC	2	–

REI

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF 3

PROJECT: ______________________ JOB NO.: ____________

SUBJECT: ______________________ COMPUTED BY: _____ DATE: _____

CHECKED BY: _____ DATE: _____

Time	Δt	VOL	Depth	ΔH	OBS.	Rate	pH
14:47	17	–	108.15	32.81	SC	2	–
14:48	18	–	109.15	33.81	SC	2	–
14:49	19	–	110.00	34.66	SC	2	–
14:50	20	–	110.80	35.46	SC	2	–
14:51	21	–	111.52	36.18	SC	2	–
14:52	22	–	112.25	36.91	SC	2	–
14:53	23	–	112.95	37.61	SC	2	–
14:54	24	–	113.67	38.33	AT	2	–
14:55	25	1	114.37	39.03	AT	2	10.4
14:57	27	–	115.70	40.36	DR	2	–
14:59	29	–	116.65	41.31	DR	2	–
15:01	31	–	117.63	42.29	DR	2	–
15:03	33	1 1/3	118.10	42.76	SC	2	9.4
15:05	35	–	118.64	43.30	SC	trouble 2 w/ flow	–
15:07	37	–	118.34	43.00	SC	2	–
15:10	40	1 2/3	119.35	44.01	SC	2	9.0
15:15	45	–	120.29	44.95	AT	2	–
15:20	50	2	120.80	45.46	AT	2	9.0
15:30	60	2 1/3	121.77	46.43	AT	3	8.9
15:36	66	2 2/3	129.00	53.66	AT	3	8.8

CALCULATIONS AND COMPUTATIONS

PROJECT:

JOB NO.:

SUBJECT:

COMPUTED BY: DATE:

CHECKED BY: DATE:

Time	Δt	VOL	Depth	ΔH	OBS.	Rate	pH
15:40	70	3	133.35	58.01	A.T	3	8.6
15:45	75	3 1/3	Below 136.	—	AT	3	8.6
15:51	81	3 2/3	"	-	AT	3	8.6
16:00	90	4 1/3	"	—	AT	3.2	8.6
16:13	103	5 1/4	"	—	AT	32	8.4
16:15	105	—	"	—	AT	2.25	—
16:27	117	—	135.78	60.44	AT	2.25	—
16:30	120	6	—	—	AT	2.25	8.6
16:35	125	—	134.25	58.91	AT	2.25	—
16:41	131	6 1/2	—	—	AT	2.25	8.5
16:45	135	—	134.36	59.02	AT	2.25	—
16:52	142	7	—	—	AT	2.25	8.5
17:00	150	—	134.81	59.47	AT	2.25	—
17:03	153	7 1/2	—	—	AT	2.25	8.5
17:15	165	8	Below 136.	—	AT	2.25	8.5
17:30	180	—	"	—	AT	2.25	—
17:40	190	9	"	—	AT	2.25	8.5
17:45	195	9 1/2	"	—	AT	2.25	8.5

REI

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF 3

PROJECT: FRENCH

JOB NO.: 275-141

SUBJECT: Recovery of 12-1

COMPUTED BY: DATE: 9/11

CHECKED BY: DATE:

Time	Δt	VOL	Depth	ΔH	OBS.	Rate	pH
17:46	0		Below 136	0	DRG		
17:46:30	.5		134.38	1.62			
17:47	1.0		132.75	3.25			
17:47:30	1.5		131.10	4.9			
17:48	2		129.43	6.57			
17:48:30	2.5		127.77	8.23			
17:49	3		126.22	9.78			
17:49:30	3.5		124.69	11.31			
17:50	4		123.25	12.75			
17:51	5		120.94	15.06			
17:52	6		118.83	17.17			
17:52:30	6.5		117.625	18.375			
17:53	7		116.505	19.495			
17:53:30	7.5		115.38	20.62			
17:54	8		114.265	21.735			
17:54:30	8.5		113.25	22.75			
17:55	9		112.26	23.74			
17:55:30	9.5		111.22	24.78			
17:56	10		110.26	25.74			
17:56:30	10.5		109.34	26.66			

REI

CALCULATIONS AND COMPUTATIONS

SHEET 2 OF 3

PROJECT: FRENCH

JOB NO.: 275-14

SUBJECT: Recovery 12-1

COMPUTED BY: ____ DATE: 9/11

CHECKED BY: ____ DATE: ____

Time	Δt	VOL	Depth	ΔH	OBS.	Rate	pH
17:57	11		108.45	27.55	DRG		
17:57:30	11.5		107.51	28.49			
17:58	12		106.69	29.49			
17:58:30	12.5		105.86	30.14			
17:59	13		105.08	30.92			
17:59:30	13.5		104.29	31.71			
18:00	14		103.58	32.42			
18:01	14.5		102.84	33.16			
18:01	15		102.15	33.85			
18:02	16		100.80	35.20			
18:03	17		99.57	36.43			
18.04	18		98.41	37.59			
18:05	19		97.30	38.70			
18:06	20		96.28	39.72			
18:07	21		95.32	40.68			
18:08	22		94.39	41.61			
18:09	23		93.55	42.45			
18:10	24		92.75	43.25			
18:11	25		91.98	44.02			
18:13	27		90.58	45.42			

REI

CALCULATIONS AND COMPUTATIONS

PROJECT: FRENCH

JOB NO.: 275-14

SUBJECT: Recovery 12-1

COMPUTED BY: ____ DATE: 9/11

CHECKED BY: ____ DATE: ____

Time	Δt	VOL	Depth	ΔH	OBS.	Rate	pH
18:15	29		89.36	46.64	A T		
18:17	31		88.25	47.75	A T		
18:19	33		87.29	48.71	A T		
18:21	35		86.45	49.55	A T		
18:24	38		85.33	50.67	A T		
18:27	41		84.36	51.64	A T		
18:30	44		83.56	52.44	A T		
18:31	45		23.31	52.69	A T		

REI

Appendix 24

Test Data for Artifical
Penetration Anomoly

CALCULATIONS AND COMPUTATIONS SHEET ___ OF ___

PROJECT: French, GW-25 Correlation Test

JOB NO.:

SUBJECT: FLOW RATE MONITORING SHEET

COMPUTED BY: ___ DATE: 9/19/86

CHECKED BY: ___ DATE: ___

15-20sec

5 min

10-15 min

FLOW RATE	TIME (2400)	MONITORS INITIALS	FLOW RATE	TIME (2400)	MONITORS INITIALS
Start	1220	DD			
30	1220:23	DD			
29	1220:46	DD			
27.9	1221	DD			
14	1221:[illegible]	DD			
[illegible]		DD			
14	12:22:28	DD			
15	12:23:30	DD			
14.9	12:25	DD			
14.8	12:30	DD			
14.5	12:35	DD			
[illegible]	[illegible]	DD			
14.7	13:00	DD			
14.6	13:15	DD			
14.9	13:30	DD			
14.9	13:45	DD			
14.6	14:00	DD			
set to 14.1	14:07	DD			
14.0	14:15	DD			
14.0	14:30	DD			
14.0	14:49	DD			
14.0	15:00	DD			
14.0	15:15	DD			
14.2	15:30	DD			
18	15:57:30	DD			
Stop	16:00	DD			

REI

FRENCH LTD. GW-25 TEST
Run 1
09/19/86

SE200B DATA
constant rate test

test is to be compared with
REI 10-1pump test data

TRANSDUCER TABLE

Input 1: REI 10-1
Transducer s/n: 139
Scale factor: 49.59
Initial level: 81 feet

Input 2: GW-25
Transducer s/n: 1857/858
Scale factor: 50.4
Initial level: 84.64 feet

Input 3: NONE
Transducer s/n: NONE
Scale factor: 1

Input 4: REI 3-4
Transducer s/n: 1504/854
Scale factor: 10.09
Initial level: 82.31 feet

Input 5: REI 11
Transducer s/n: 1076/849
Scale factor: 10.07
Initial level: 79.97 feet

Input 6: P-10-2
Transducer s/n: 1634/857
Scale factor: 10.08
Initial level: 46.07 feet

Input 7: P-10-3
Transducer s/n: 1518/854
Scale factor: 10.08
Initial level: 40.09 feet

Input 8: P-10-4
Transducer s/n: 2344/85N
Scale factor: 10.13
Initial level: 38.82 feet

Input 9: REI 10-2
Transducer s/n: 516/830
Scale factor: 10.04
Initial level: 5.67 feet

Input 10: REI 10-3A
Transducer s/n: 596/841
Scale factor: 10.03
Initial level: 7.05 feet

FAST DATA

Input 11: REI 10-3B
Transducer s/n: 383/839
Scale factor: 10.05
Initial level: 7.05 feet

Input 12: REI 10-4
Transducer s/n: 1631/857
Scale factor: 10.05
Initial level: 7.56 feet

PUMP SCHEDULE

Drawdown for 1000 min
Pump at 30 GPM
Pump set at 140 feet

Recovery for 500 min

SAMPLING SCHEDULE

0-10	sec	@	1	sec
10-60	sec	@	5	sec
1-10	min	@	20	sec
10-100	min	@	2	min
100-1000	min	@	20	min
1000-10000	min	@	60	min
10000-99999	min	@	200	min

---------DRAWDOWN REPORT---------

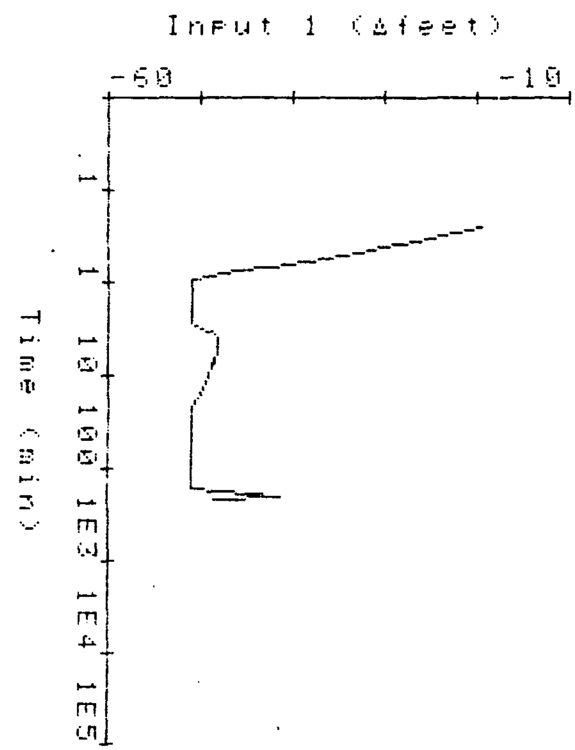
Started at 1220
Lasted 219.98 min

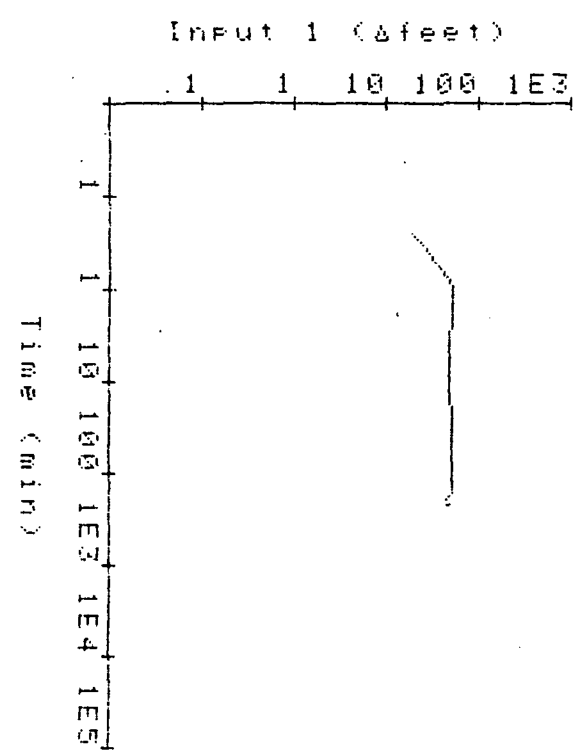
Input 1 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	81.00	0.00
1220	0.257	100.42	-19.42
1220	0.341	105.94	-24.94
1220	0.424	110.93	-29.93
1220	0.507	115.39	-34.39
1220	0.591	119.54	-38.54
1220	0.674	123.35	-42.35
1220	0.757	126.85	-45.86
1220	0.841	130.17	-49.17
1220	0.924	131.87	-50.87
1221	1.007	131.87	-50.87
1221	1.417	131.89	-50.89
1221	1.750	131.90	-50.90
1222	2.084	131.90	-50.90
1222	2.417	131.92	-50.92
1222	2.750	131.92	-50.92
1223	3.084	130.92	-49.92
1223	3.417	129.76	-48.76
1223	3.750	129.34	-48.34
1224	4.084	129.19	-48.19
1224	4.417	129.10	-48.10
1224	4.750	129.04	-48.04
1225	5.084	129.04	-48.04
1225	5.417	129.03	-48.03
1225	5.750	129.11	-48.12
1226	6.084	129.20	-48.20
1226	6.417	129.30	-48.30
1226	6.750	129.36	-48.36
1227	7.084	129.47	-48.47
1227	7.417	129.54	-48.55
1227	7.750	129.64	-48.64
1228	8.084	129.71	-48.72
1228	8.417	129.80	-48.80
1228	8.750	129.89	-48.89
1229	9.084	129.94	-48.94
1229	9.417	130.01	-49.02
1229	9.750	130.07	-49.07
1230	10.084	130.14	-49.14
1232	12.111	130.50	-49.50
1234	14.111	130.79	-49.79
1236	16.099	131.07	-50.07
1238	18.098	131.32	-50.32
1240	20.098	131.53	-50.53

1242	22.098	131.92	-50.92
1244	24.098	131.92	-50.92
1246	26.098	131.92	-50.92
1248	28.098	131.92	-50.92
1250	30.098	131.92	-50.92
1252	32.098	131.92	-50.92
1254	34.098	131.92	-50.92
1256	36.123	131.92	-50.92
1258	38.265	131.92	-50.92
1300	40.108	131.92	-50.92
1302	42.202	131.92	-50.92
1304	44.160	131.92	-50.92
1306	46.160	131.92	-50.92
1308	48.160	131.92	-50.92
1310	50.188	131.90	-50.90
1312	52.113	131.92	-50.92
1314	54.113	131.92	-50.92
1316	56.113	131.90	-50.90
1318	58.113	131.92	-50.92
1320	60.113	131.90	-50.90
1322	62.238	131.92	-50.92
1324	64.113	131.90	-50 90
1326	66.113	131.92	-50.92
1328	68.113	131.92	-50.92
1330	70.113	131.92	-50.92
1332	72.113	131.92	-50.92
1334	74.113	131.92	-50.92
1336	76.133	131.90	-50.90
1338	78.113	131.92	-50.92
1340	80.113	131.92	-50.92
1342	82.212	131.92	-50.92
1344	84.113	131 92	-50.92
1346	86.105	131.92	-50.92
1348	88.113	131.92	-50.92
1350	90.113	131.92	-50.92
1352	92.245	131.92	-50.92
1354	94.113	131.92	-50 92
1356	96.113	131.92	-50.92
1358	98.113	131.92	-50.92
1420	120.110	131.92	-50.92
1440	140.250	131.92	-50.92
1500	160.110	131.92	-50.92
1520	180.030	128.41	-47.41
1540	200.120	122.28	-41 28
1559	219 980	129.30	-48.30

Average level: 130.30


Input 1 (Δfeet)
-60
-10
Time (min)
.1
1
10
100
1E3
1E4
1E5

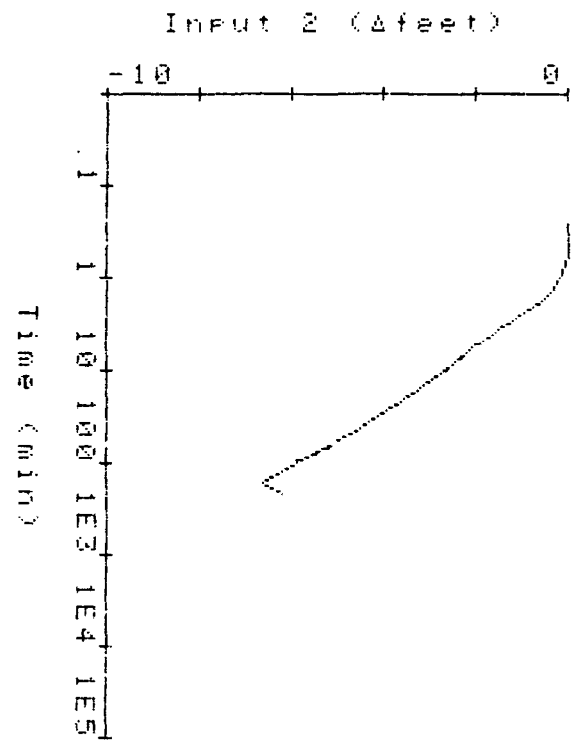

Input 1 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

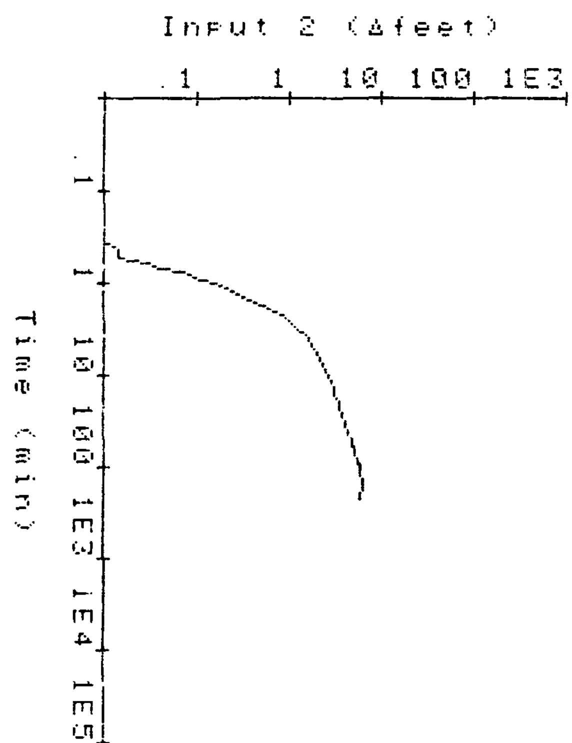
InPut 2 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	84.64	0.00
1220	0.257	84.64	0.00
1220	0.341	84.64	0.00
1220	0.424	84.65	-0.01
1220	0.507	84.65	-0.01
1220	0.591	84.67	-0.03
1220	0.674	84.68	-0.04
1220	0.757	84.71	-0.07
1220	0.841	84.74	-0.10
1220	0.924	84.76	-0.12
1221	1.007	84.80	-0 16
1221	1.417	84.99	-0.35
1221	1.750	85 18	-0.54
1222	2.084	85.38	-0.74
1222	2.417	85.57	-0.93
1222	2.750	85.74	-1.10
1223	3.084	85.90	-1.26
1223	3.417	86.05	-1 41
1223	3.750	86.17	-1.53
1224	4.084	86.28	-1.64
1224	4.417	86.38	-1.74
1224	4.750	86.46	-1.82
1225	5.084	86.54	-1.90
1225	5.417	86.62	-1.98
1225	5.750	86.67	-2.03
1226	6.084	86.75	-2.11
1226	6.417	86.81	-2.17
1226	6.750	86.86	-2.22
1227	7.084	86.92	-2.28
1227	7.417	86.97	-2.33
1227	7.750	87.02	-2.38
1228	8.084	87.07	-2.43
1228	8.417	87.11	-2.47
1228	8.750	87.17	-2.53
1229	9.084	87.20	-2.56
1229	9.417	87.24	-2.60
1229	9.750	87.29	-2.64
1230	10.084	87.33	-2.69
1232	12.111	87.55	-2.91
1234	14 111	87.74	-3.10
1236	16.099	87.88	-3.24
1238	18.098	88.03	-3.39
1240	20.098	88.17	-3.53
1242	22.098	88.27	-3.63
1244	24.098	88.39	-3.75
1246	26.098	88.51	-3.87
1248	28.098	88.61	-3.97
1250	30.098	88.69	-4.05
1252	32.098	88.78	-4.14

1254	34.098	88.87	-4.23
1256	36.123	88.94	-4.30
1258	38.265	89.03	-4.39
1300	40.108	89.09	-4.45
1302	42.202	89.16	-4.52
1304	44 160	89.23	-4.59
1306	46.160	89.29	-4.65
1308	48.160	89.35	-4.71
1310	50.188	89.41	-4.77
1312	52.113	89.46	-4.82
1314	54.113	89.52	-4.88
1316	56.113	89.58	-4.94
1318	58.113	89.62	-4.98
1320	60.113	89.68	-5.04
1322	62.238	89.73	-5.09
1324	64.113	89.77	-5.13
1326	66.113	89.81	-5.17
1328	68.113	89.86	-5.22
1330	70.113	89.90	-5.26
1332	72.113	89.96	-5.32
1334	74 113	90.00	-5.36
1336	76.133	90.05	-5.41
1338	78.113	90.10	-5.46
1340	80.113	90.15	-5.51
1342	82.212	90.19	-5.55
1344	84.113	90.24	-5.59
1346	86.105	90.28	-5.64
1348	88.113	90.32	-5.68
1350	90.113	90.37	-5.73
1352	92.245	90.41	-5.77
1354	94.113	90.45	-5.81
1356	96.113	90.50	-5.86
1358	98.113	90.54	-5.90
1420	120.110	90.82	-6.18
1440	140.250	91.08	-6.44
1500	160.110	91.30	-6 66
1520	180.030	91.21	-6.57
1540	200.120	90.89	-6.25
1559	219.980	90.82	-6.18

Average level: 90.15


Input 2 (Δfeet)
-10
0
Time (min)
.1
1
10
100
1E3
1E4
1E5

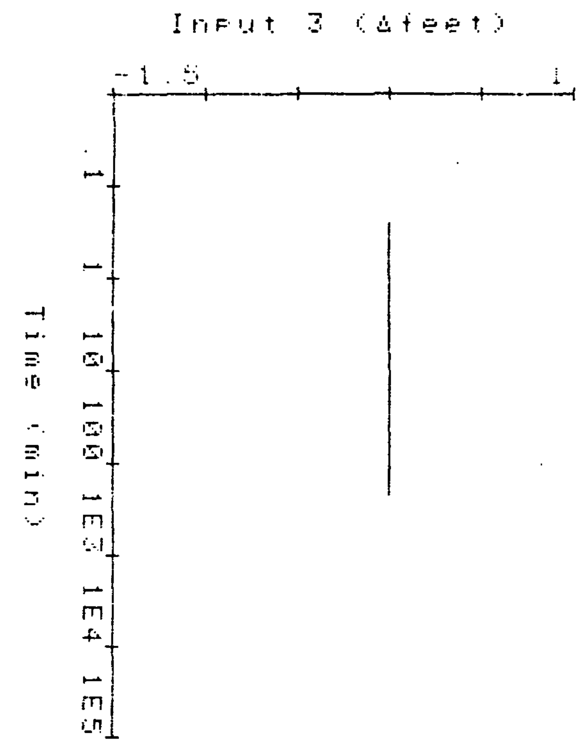

Input 2 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

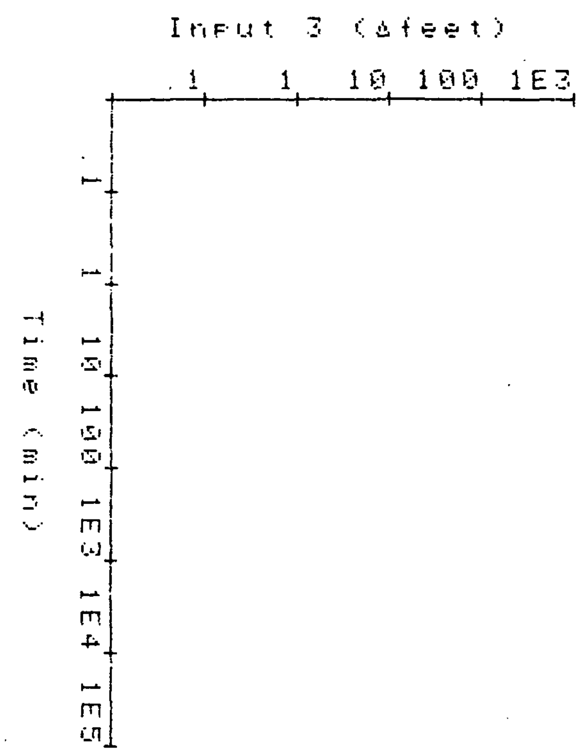
Input 3 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	0.00	0.00
1220	0.257	0.00	-0.00
1220	0.341	0.00	0.00
1220	0.424	-0.00	0.00
1220	0.507	-0.00	0.00
1220	0.591	-0.00	0.00
1220	0.674	-0.00	0.00
1220	0.757	-0.00	0.00
1220	0.841	-0.00	0.00
1220	0.924	-0.00	0.00
1221	1.007	-0.00	0.00
1221	1.417	-0.00	0.00
1221	1.750	-0.00	0.00
1222	2.084	-0.00	0.00
1222	2.417	0.00	0.00
1222	2.750	0.00	-0.00
1223	3.084	-0.00	0.00
1223	3.417	0.00	0.00
1223	3.750	-0.00	0.00
1224	4.084	-0.00	0.00
1224	4.417	0.00	0.00
1224	4.750	-0.00	0.00
1225	5.084	0.00	0.00
1225	5.417	-0.00	0.00
1225	5.750	0.00	0.00
1226	6.084	0.00	-0.00
1226	6.417	-0.00	0.00
1226	6.750	0.00	0.00
1227	7.084	-0.00	0.00
1227	7.417	-0.00	0.00
1227	7.750	-0.00	0.00
1228	8.084	-0.00	0.00
1228	8.417	0.00	-0.00
1228	8.750	0.00	0.00
1229	9.084	-0.00	0.00
1229	9.417	-0.00	0.00
1229	9.750	0.00	-0.00
1230	10.084	0.00	-0.00
1232	12.111	0.00	0.00
1234	14.111	-0.00	0.00
1236	16.099	-0.00	0.00
1238	18.098	-0.00	0.00
1240	20.098	-0.00	0.00
1242	22.098	-0.00	0.00
1244	24.098	-0.00	0.00
1246	26.098	-0.00	0.00
1248	28.098	-0.00	0.00

1250	30.098	-0.00	0.00
1252	32.098	-0.00	0.00
1254	34.098	-0.00	0.00
1256	36.123	-0.00	0.00
1258	38.265	-0.00	0 00
1300	40.108	-0.00	0.00
1302	42.202	-0.00	0.00
1304	44.160	-0.00	0.00
1306	46.160	-0.00	0.00
1308	48.160	-0.00	0.00
1310	50.188	-0.00	0.00
1312	52.113	-0.00	0.00
1314	54.113	-0.00	0.00
1316	56.113	0.00	0.00
1318	58.113	-0.00	0.00
1320	60.113	-0.00	0.00
1322	62.238	0.00	0.00
1324	64.113	-0.00	0.00
1326	66.113	-0.00	0.00
1328	68.113	-0.00	0.00
1330	70.113	-0.00	0.00
1332	72.113	0.00	0.00
1334	74.113	-0.00	0.00
1336	76.133	-0.00	0 00
1338	78.113	-0.00	0.00
1340	80.113	-0.00	0 00
1342	82.212	-0.00	0.00
1344	84.113	-0.00	0.00
1346	86.105	-0.00	0.00
1348	88.113	-0.00	0.00
1350	90.113	-0.00	0.00
1352	92.245	-0.00	0.00
1354	94.113	-0.00	0.00
1356	96.113	-0.00	0.00
1358	98.113	0.00	0.00
1420	120 110	0.00	-0.00
1440	140.250	0.00	0.00
1500	160.110	0.00	-0.00
1520	180.030	0.00	-0.00
1540	200.120	0.00	0.00
1559	219.980	-0.00	0.00

Average level: -0.00


Input 3 (Δfeet)
-1.5
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

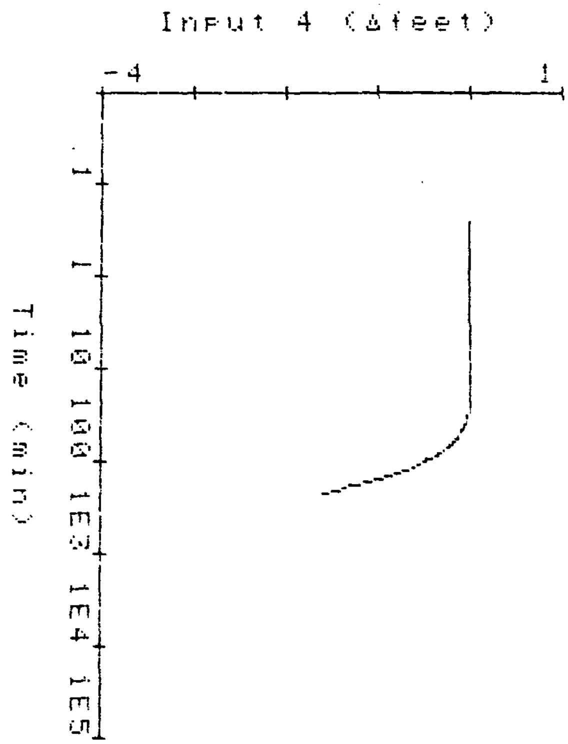

Input 3 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

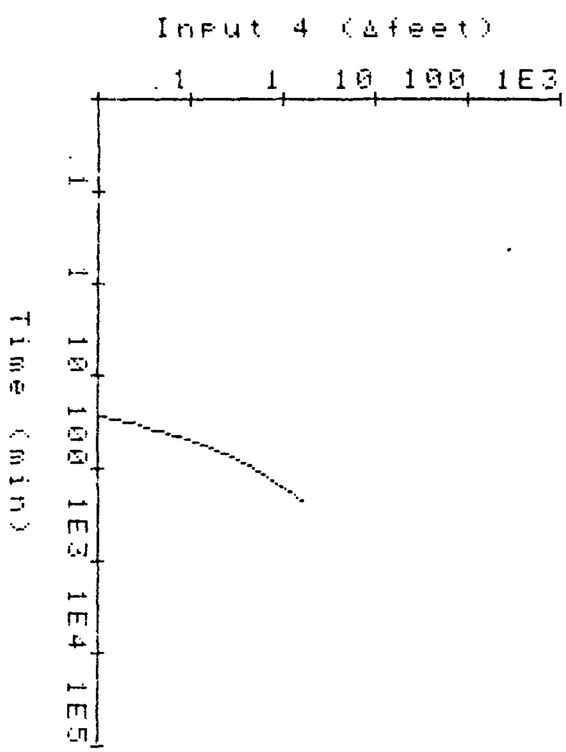
Input 4 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	82.31	0.00
1220	0.257	82.31	0.00
1220	0.341	82.31	0.00
1220	0.424	82.31	0.00
1220	0.507	82.31	0.00
1220	0.591	82.31	0.00
1220	0.674	82.31	0.00
1220	0.757	82.31	0.00
1220	0.841	82.31	0.00
1220	0.924	82.31	0.00
1221	1.007	82.31	0.00
1221	1.417	82.31	0.00
1221	1.750	82.31	0.00
1222	2.084	82.31	0.00
1222	2.417	82.31	0.00
1222	2.750	82.31	0.00
1223	3.084	82.31	0.00
1223	3.417	82.31	0.00
1223	3.750	82.31	0.00
1224	4.084	82.31	0.00
1224	4.417	82.31	0.00
1224	4.750	82.31	0.00
1225	5.084	82.31	0.00
1225	5.417	82.31	0.00
1225	5.750	82.31	0.00
1226	6.084	82.31	0.00
1226	6.417	82.31	0.00
1226	6.750	82.31	0.00
1227	7.084	82.31	0.00
1227	7.417	82.31	0.00
1227	7.750	82.31	0.00
1228	8.084	82.31	0.00
1228	8.417	82.31	0.00
1228	8.750	82.31	0.00
1229	9.084	82.31	0.00
1229	9.417	82.31	0.00
1229	9.750	82.31	0.00
1230	10.084	82.31	0.00
1232	12.111	82.31	0.00
1234	14.111	82.31	0.00
1236	16.099	82.31	0.00
1238	18.098	82.31	0.00
1240	20.098	82.31	0.00
1242	22.098	82.31	-0.00
1244	24.098	82.31	-0.00
1246	26.098	82.32	-0.01
1248	28.098	82.32	-0.01
1250	30.098	82.33	-0.01
1252	32.098	82.33	-0.02
1254	34.098	82.34	-0.03
1256	36.123	82.35	-0.03

1258	38.265	82.35	-0.04
1300	40.108	82.36	-0.05
1302	42.202	82.37	-0.06
1304	44.160	82.38	-0.07
1306	46.160	82.39	-0.08
1308	48.160	82.40	-0.09
1310	50.188	82.41	-0.10
1312	52.113	82.42	-0.11
1314	54.113	82.44	-0.13
1316	56.113	82.45	-0.14
1318	58.113	82.46	-0.15
1320	60.113	82.47	-0.16
1322	62.238	82.49	-0.18
1324	64.113	82.51	-0.19
1326	66.113	82.52	-0.21
1328	68.113	82.53	-0.22
1330	70.113	82.55	-0 24
1332	72.113	82.57	-0.26
1334	74.113	82.58	-0.27
1336	76.133	82.60	-0.29
1338	78.113	82.62	-0.31
1340	80.113	82.63	-0.32
1342	82.212	82.65	-0.34
1344	84.113	82.67	-0.35
1346	86.105	82.68	-0.37
1348	88.113	82.70	-0.39
1350	90.113	82.72	-0.41
1352	92.245	82.74	-0.43
1354	94.113	82.76	-0.45
1356	96.113	82.78	-0.47
1358	98.113	82.79	-0.48
1420	120.110	83.00	-0.69
1440	140.250	83.20	-0.89
1500	160.110	83.39	-1.08
1520	180.030	83.58	-1.27
1540	200.120	83.76	-1.45
1559	219.980	83.91	-1.60

Average level: 83.02


Input 4 (Δfeet)
-4
1
Time (min)
.1
1
10
100
1E3
1E4
1E5

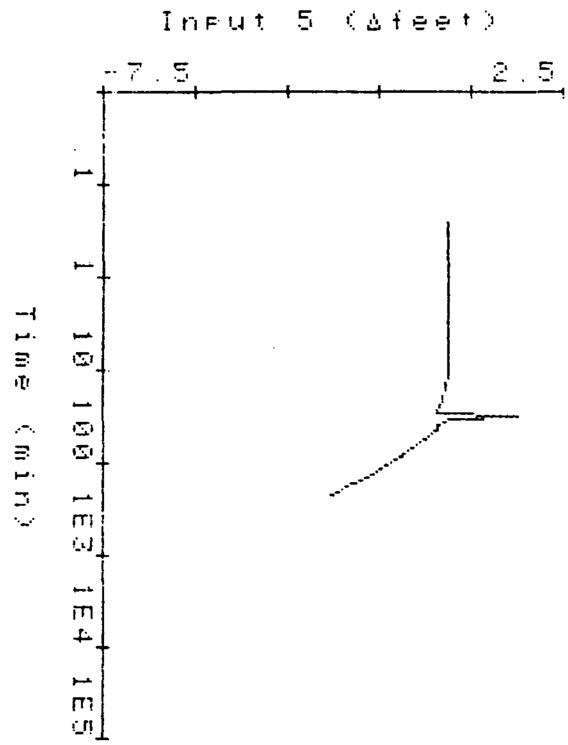

Input 4 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

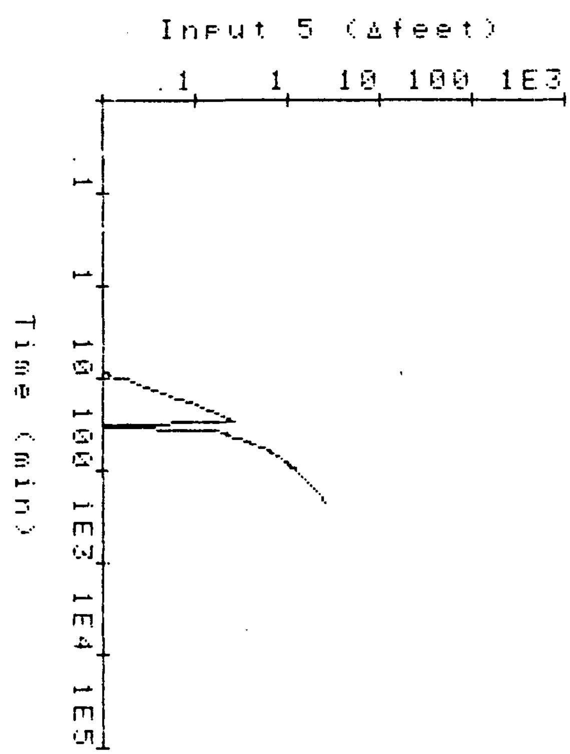
Input 5 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	79.97	0.00
1220	0.257	79.97	0.00
1220	0.341	79.97	0.00
1220	0.424	79.97	0.00
1220	0.507	79.97	0.00
1220	0.591	79.97	0.00
1220	0.674	79.97	0.00
1220	0.757	79.97	0.00
1220	0.841	79.97	0.00
1220	0.924	79.97	0.00
1221	1 007	79.97	0.00
1221	1.417	79.97	0.00
1221	1.750	79.97	0.00
1222	2.084	79.97	0.00
1222	2.417	79.97	0.00
1222	2.750	79.97	0 00
1223	3.084	79.97	-0.00
1223	3.417	79.97	0.00
1223	3.750	79.97	0 00
1224	4.084	79.97	0.00
1224	4.417	79.97	0 00
1224	4.750	79.97	0.00
1225	5.084	79.97	0.00
1225	5.417	79.97	-0.00
1225	5.750	79.97	-0.00
1226	6.084	79.97	-0.00
1226	6.417	79.97	-0 00
1226	6.750	79.97	-0.00
1227	7.084	79.98	-0.01
1227	7.417	79.98	-0.01
1227	7.750	79.98	-0 01
1228	8.084	79.98	-0.01
1228	8.417	79.98	-0.01
1228	8.750	79.98	-0.01
1229	9.084	79.98	-0.01
1229	9.417	79.98	-0.01
1229	9.750	79.99	-0.01
1230	10.084	79.99	-0.02
1232	12.111	80.00	-0.03
1234	14.111	80.02	-0.05
1236	16.099	80.04	-0.07
1238	18.098	80.06	-0.09
1240	20.098	80.09	-0.12
1242	22.098	80.12	-0.15
1244	24.098	80.15	-0.17

1246	26.098	80.17	-0.20
1248	28.098	80.21	-0.24
1250	30.098	80.24	-0.26
1252	32.098	78.50	1.47
1254	34.098	79.97	-0.00
1256	36.123	80.12	-0.15
1258	38.265	80.20	-0.23
1300	40.108	80.19	-0 22
1302	42.202	80.20	-0.23
1304	44.160	80.24	-0.26
1306	46.160	80.27	-0.30
1308	48.160	80.33	-0.36
1310	50.188	80.37	-0.40
1312	52.113	80.38	-0.41
1314	54.113	80.43	-0.46
1316	56.113	80.49	-0.52
1318	58.113	80.54	-0.57
1320	60.113	80.58	-0.60
1322	62.238	80.61	-0.64
1324	64.113	80.64	-0.66
1326	66.113	80.69	-0.72
1328	68.113	80.73	-0.76
1330	70.113	80.77	-0.80
1332	72.113	80.80	-0.83
1334	74.113	80.83	-0.86
1336	76.133	80.85	-0.88
1338	78.113	80.89	-0.91
1340	80.113	80.92	-0.95
1342	82.212	80.95	-0.98
1344	84.113	81.00	-1.03
1346	86.105	81.02	-1.05
1348	88.113	81.04	-1.07
1350	90.113	81.07	-1.10
1352	92.245	81.12	-1.15
1354	94 113	81.14	-1.17
1356	96.113	81.17	-1.20
1358	98.113	81.20	-1.23
1420	120.110	81.52	-1.55
1440	140.250	81.79	-1.82
1500	160.110	82.02	-2.05
1520	180.030	82.20	-2.23
1540	200.120	82.37	-2.40
1559	219.980	82.51	-2.53

Average level: 81.33


Input 5 (Δfeet)
-7.5
2.5
Time (min)
.1
1
10
100
1E3
1E4
1E5

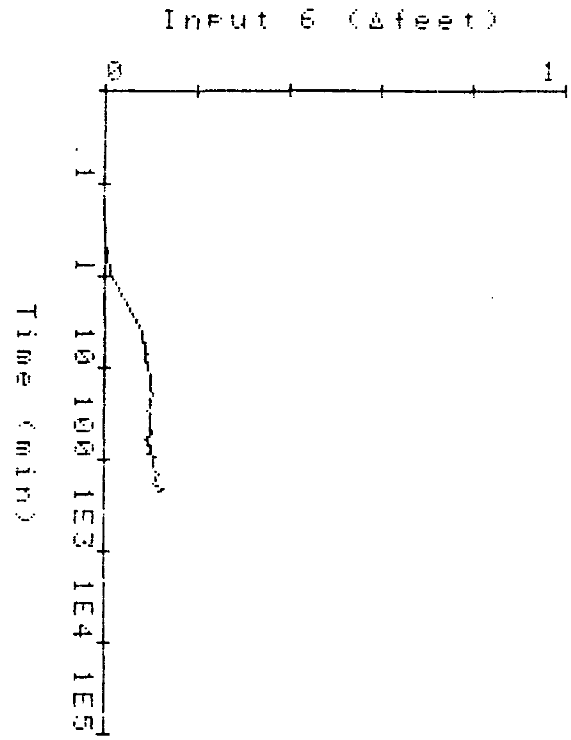

Input 5 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

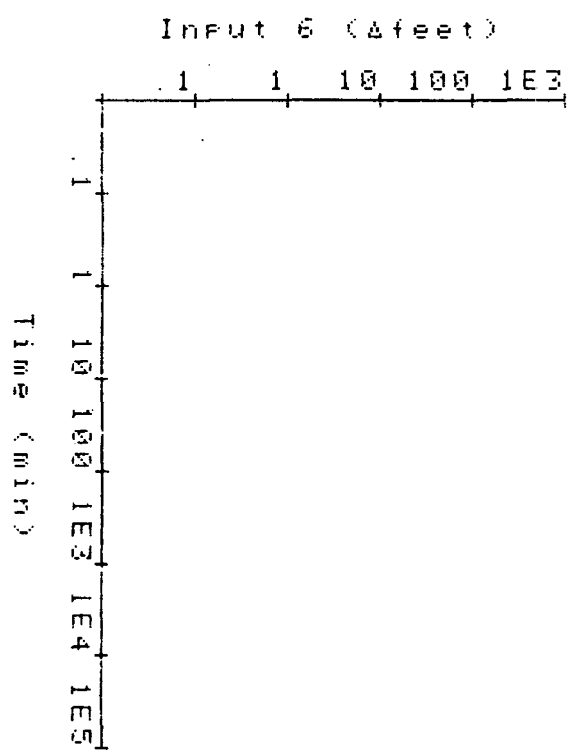
Input 6 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	46.07	0.00
1220	0.257	46.07	0.00
1220	0.341	46.07	0.00
1220	0.424	46.07	0.00
1220	0.507	46.07	0.01
1220	0.591	46.07	0.01
1220	0.674	46.07	0.01
1220	0.757	46.06	0.01
1220	0.841	46.06	0.01
1220	0.924	46.06	0.01
1221	1.007	46.06	0.02
1221	1.417	46.04	0.03
1221	1.750	46.03	0.04
1222	2.084	46.03	0.05
1222	2.417	46.02	0.06
1222	2.750	46.01	0.06
1223	3.084	46.01	0.07
1223	3.417	46.00	0.07
1223	3.750	46.00	0.08
1224	4.084	45.99	0.08
1224	4.417	45.99	0.08
1224	4.750	45.99	0.08
1225	5.084	45.99	0.08
1225	5.417	45.99	0.09
1225	5.750	45.99	0.09
1226	6.084	45.98	0.09
1226	6.417	45.98	0.09
1226	6.750	45.98	0.09
1227	7.084	45.98	0.09
1227	7.417	45.99	0.09
1227	7.750	45.99	0.09
1228	8.084	45.98	0.09
1228	8.417	45.98	0.09
1228	8.750	45.98	0.09
1229	9.084	45.98	0.09
1229	9.417	45.98	0.09
1229	9.750	45.98	0.10
1230	10.084	45.98	0.10
1232	12.111	45.98	0.10
1234	14.111	45.98	0.10
1236	16.099	45.97	0.10
1238	18.098	45.98	0.10
1240	20.098	45.97	0.10
1242	22.098	45.98	0.10
1244	24.098	45.97	0.10
1246	26.098	45.97	0.10
1248	28.098	45.97	0.10
1250	30.098	45.98	0.10

1252	32.098	45.98	0.10
1254	34.098	45.97	0.10
1256	36.123	45.97	0.10
1258	38.265	45.97	0.10
1300	40.108	45.97	0.10
1302	42.202	45.97	0.10
1304	44.160	45.97	0.10
1306	46.160	45.97	0.10
1308	48.160	45.97	0.10
1310	50.188	45.97	0.10
1312	52.113	45.97	0.10
1314	54.113	45.98	0.10
1316	56.113	45.98	0.10
1318	58.113	45.98	0.09
1320	60.113	45.98	0.09
1322	62.238	45.98	0.10
1324	64.113	45.98	0.10
1326	66.113	45.98	0.10
1328	68.113	45.98	0.09
1330	70.113	45.98	0.10
1332	72.113	45.98	0.10
1334	74.113	45.98	0.10
1336	76.133	45.98	0.10
1338	78.113	45.98	0.10
1340	80.113	45.97	0.10
1342	82.212	45.98	0.10
1344	84.113	45.98	0.10
1346	86.105	45.98	0.10
1348	88.113	45.98	0.10
1350	90.113	45.97	0.10
1352	92.245	45.97	0.11
1354	94.113	45.96	0.11
1356	96.113	45.96	0.11
1358	98.113	45.97	0.11
1420	120.110	45.97	0.11
1440	140.250	45.96	0.12
1500	160.110	45.96	0.11
1520	180.030	45.97	0.11
1540	200.120	45.94	0.13
1559	219.980	45.96	0.12

Average level: 45.97


Input 6 (Δfeet)
0
1
Time (min)
.1
1
10
100
1E3
1E4
1E5

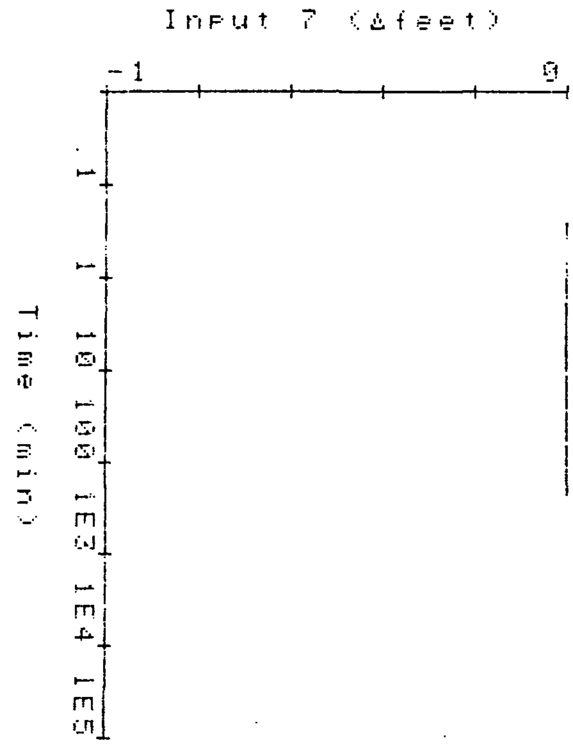

Input 6 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

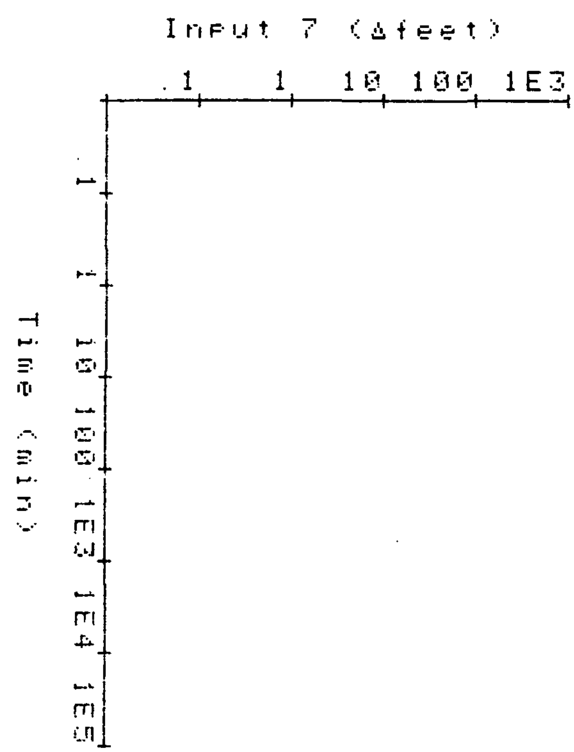
Input 7 (feet):

Time	ET (min)	level	Δlevel
1220	0 000	40 09	0.00
1220	0.257	40.09	-0.00
1220	0.341	40.09	-0.00
1220	0.424	40.09	-0.00
1220	0.507	40.09	-0.00
1220	0.591	40.09	-0.00
1220	0.674	40.09	-0.00
1220	0.757	40.09	-0.00
1220	0.841	40.09	-0.00
1220	0.924	40.09	0.00
1221	1.007	40.09	0.00
1221	1.417	40.09	0.00
1221	1.750	40.09	0.00
1222	2.084	40.09	0.00
1222	2.417	40.09	0.00
1222	2 750	40.09	0.00
1223	3.084	40.09	-0.00
1223	3.417	40.09	-0.00
1223	3.750	40.09	0.00
1224	4.084	40.09	-0.00
1224	4.417	40.09	0.00
1224	4.750	40.09	0.00
1225	5.084	40.09	0.00
1225	5.417	40.09	-0.00
1225	5.750	40.09	-0.00
1226	6.084	40.09	0.00
1226	6.417	40.09	0.00
1226	6.750	40.09	-0.00
1227	7.084	40.09	-0.00
1227	7.417	40.09	-0.00
1227	7.750	40.09	-0.00
1228	8.084	40.09	0.00
1228	8.417	40.09	0.00
1228	8.750	40.09	-0.00
1229	9.084	40.09	-0.00
1229	9.417	40.09	-0.00
1229	9.750	40.09	-0.00
1230	10.084	40.09	-0.00
1232	12.111	40.09	-0.00
1234	14.111	40.09	-0.00
1236	16.099	40.09	-0.00
1238	18.098	40.09	-0.00
1240	20.098	40.09	0.00
1242	22.098	40.09	-0.00

1244	24.098	40.09	-0.00
1246	26.098	40.09	0.00
1248	28.098	40.09	0.00
1250	30.098	40.09	0.00
1252	32.098	40.09	0.00
1254	34.098	40.09	-0.00
1256	36.123	40.09	0.00
1258	38.265	40.09	0.00
1300	40.108	40.09	-0.00
1302	42.202	40.09	0.00
1304	44.160	40.09	-0.00
1306	46.160	40.09	-0.00
1308	48.160	40.09	0.00
1310	50.188	40.09	-0.00
1312	52 113	40.09	0.00
1314	54.113	40.09	-0.00
1316	56.113	40 09	0.00
1318	58.113	40.09	0.00
1320	60.113	40.09	0.00
1322	62.238	40.09	-0.00
1324	64.113	40.09	0.00
1326	66.113	40.09	-0.00
1328	68.113	40.09	0.00
1330	70.113	40.09	-0.00
1332	72.113	40.09	0.00
1334	74.113	40.09	-0.00
1336	76.133	40.09	0.00
1338	78.113	40.09	-0.00
1340	80.113	40.09	0.00
1342	82.212	40.09	0.00
1344	84.113	40.09	0.00
1346	86.105	40.09	0.00
1348	88.113	40.09	-0.00
1350	90.113	40.09	-0.00
1352	92.245	40.09	0.00
1354	94.113	40.09	0.00
1356	96.113	40.09	0.00
1358	98.113	40.09	0.00
1420	120.110	40.09	0.00
1440	140.250	40.09	0.00
1500	160.110	40.09	0.00
1520	180.030	40.09	0.00
1540	200.120	40.09	0.00
1559	219.980	40.09	0.00

Average level: 40.09


Input 7 (Δfeet)
-1
0
.1
1
10
100
1E3
1E4
1E5
Time (min)

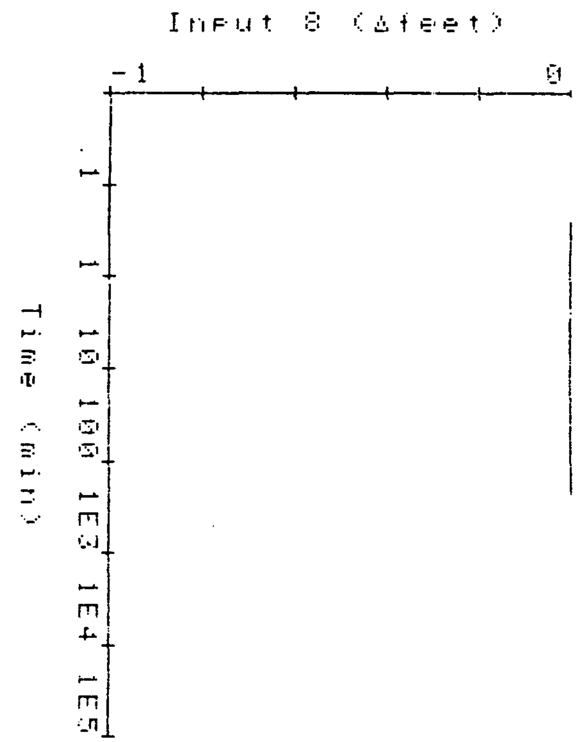

Input 7 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

Input 6 (feet):

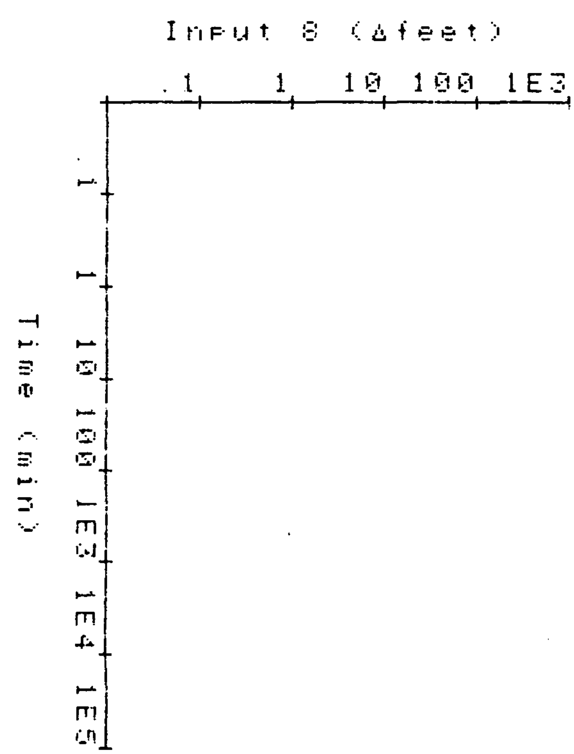
Time	ET (min)	level	Δlevel
1220	0.000	38.82	0.00
1220	0.257	38.82	0.00
1220	0.341	38.83	-0.00
1220	0.424	38.82	0.00
1220	0.507	38.82	0.00
1220	0.591	38.82	0.00
1220	0.674	38.82	0.00
1220	0.757	38.82	0.00
1220	0.841	38.82	0.00
1220	0.924	38.82	0.00
1221	1.007	38.82	0.00
1221	1.417	38.82	0.00
1221	1.750	38.82	0.00
1222	2.084	38.82	0.00
1222	2.417	38.82	0.00
1222	2.750	38.82	0.00
1223	3.084	38.82	0.00
1223	3.417	38.82	0.00
1223	3.750	38.82	0.00
1224	4.084	38.83	-0.00
1224	4.417	38.82	0.00
1224	4.750	38.82	0.00
1225	5.084	38.82	0.00
1225	5.417	38.82	0.00
1225	5.750	38.82	0.00
1226	6.084	38.82	0.00
1226	6.417	38.82	0.00
1226	6.750	38.82	0.00
1227	7.084	38.83	-0.00
1227	7.417	38.82	0.00
1227	7.750	38.82	0.00
1228	8.084	38.82	0.00
1228	8.417	38.82	0.00
1228	8.750	38.82	0.00
1229	9.084	38.82	0.00
1229	9.417	38.82	0.00
1229	9.750	38.82	0.00
1230	10.084	38.82	0.00
1232	12.111	38.82	0.00
1234	14.111	38.82	0.00
1236	16.099	38.82	0.00
1238	18.098	38.82	0.00
1240	20.098	38.82	0.00
1242	22.098	38.82	0.00
1244	24.098	38.82	0.00
1246	26.098	38.82	0.00
1248	28.098	38.82	0.00

1250	30.098	38.82	0.00
1252	32.098	38.82	0.00
1254	34.098	38.82	0.00
1256	36.123	38.82	0.00
1258	38.265	38.82	0.00
1300	40.108	38.82	0.00
1302	42.202	38.82	0.00
1304	44.160	38.82	0.00
1306	46.160	38.82	0.00
1308	48.160	38.82	0.00
1310	50.188	38.82	0.00
1312	52.113	38.82	0.00
1314	54.113	38.82	0.00
1316	56.113	38.82	0.00
1318	58.113	38.82	0.00
1320	60.113	38.82	0.00
1322	62.238	38.82	0.00
1324	64.113	38.82	0.00
1326	66.113	38.82	0.00
1328	68.113	38.82	0.00
1330	70.113	38.82	0.00
1332	72.113	38.82	0.00
1334	74.113	38.82	0.00
1336	76.133	38.82	0.00
1338	78.113	38.82	0.00
1340	80.113	38.82	0.00
1342	82.212	38.82	0.00
1344	84.113	38.82	0.00
1346	86.105	38.82	0.00
1348	88.113	38.82	0.00
1350	90.113	38.82	0.00
1352	92.245	38.82	0.00
1354	94.113	38.82	0.00
1356	96.113	38.82	0.00
1358	98.113	38.82	0.00
1420	120.110	38.82	0.00
1440	140.250	38.82	0.00
1500	160.110	38.83	-0.00
1520	180.030	38.82	0.00
1540	200.120	38.82	0.00
1559	219.980	38.83	-0.00

Average level: 38.82



Input 8 (Δfeet)
-1
0
.1
1
10
100
1E3
1E4
1E5
Time (min)



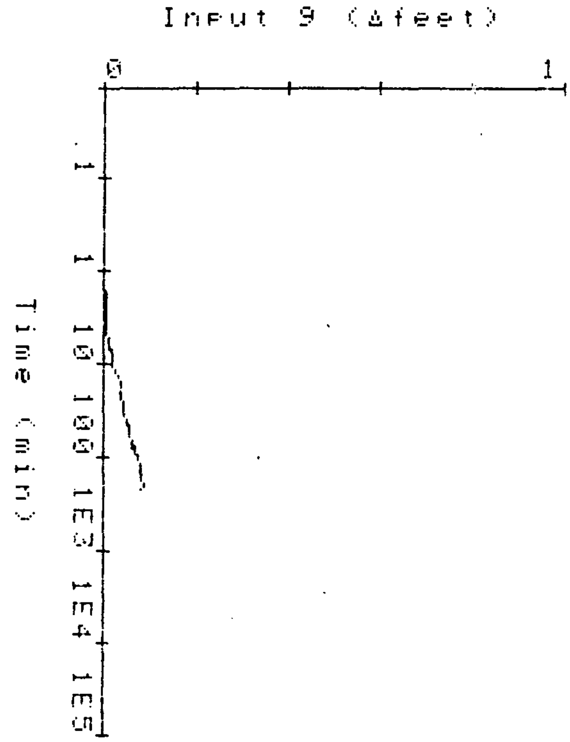
Input 8 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

Input 9 (feet):

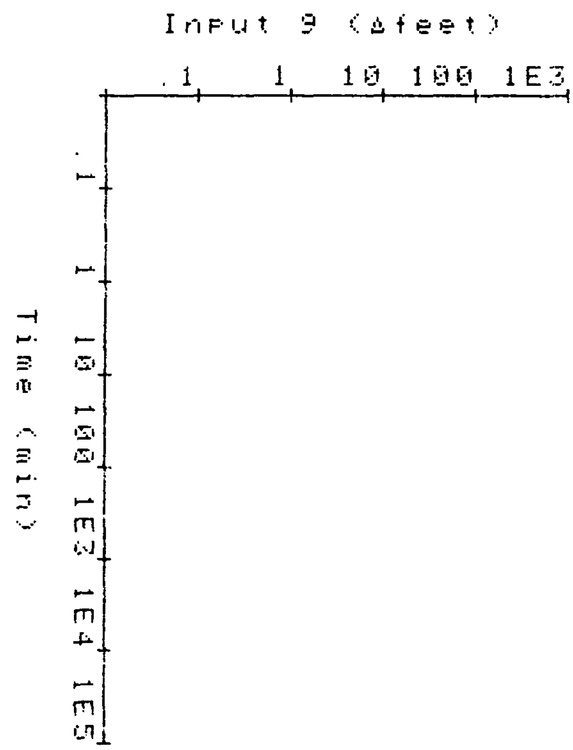
Time	ET (min)	level	Δlevel
1220	0.000	5.67	0.00
1220	0.257	5.67	0.00
1220	0 341	5.67	0.00
1220	0.424	5.67	0.00
1220	0.507	5.67	0.00
1220	0.591	5.67	0.00
1220	0.674	5.67	0.00
1220	0.757	5.67	0.00
1220	0.841	5.67	0 00
1220	0.924	5.67	0.00
1221	1.007	5.67	0.00
1221	1.417	5.67	0.00
1221	1.750	5.66	0.01
1222	2.084	5.66	0.01
1222	2.417	5.66	0 01
1222	2.750	5.66	0.01
1223	3.084	5.66	0.01
1223	3.417	5.66	0.01
1223	3.750	5.66	0.01
1224	4.084	5.66	0.01
1224	4.417	5.66	0.01
1224	4.750	5.66	0.01
1225	5.084	5.66	0.01
1225	5.417	5.66	0.01
1225	5.750	5.66	0.01
1226	6.084	5.66	0.01
1226	6.417	5.66	0.01
1226	6.750	5.66	0.01
1227	7.084	5.65	0.02
1227	7.417	5.65	0.02
1227	7.750	5.65	0.02
1228	8.084	5.65	0.02
1228	8.417	5.65	0.02
1228	8.750	5.65	0.02
1229	9.084	5 65	0.02
1229	9.417	5.65	0.02
1229	9 750	5.65	0.02
1230	10.084	5.65	0.02
1232	12.111	5.64	0.03
1234	14.111	5.64	0.03
1236	16.099	5 64	0.03
1238	18.098	5.64	0.03
1240	20.098	5.63	0.04
1242	22.098	5.63	0.04
1244	24 098	5.63	0.04
1246	26.098	5.63	0.04
1248	28.098	5.63	0.04
1250	30.098	5.63	0.04
1252	32.098	5.62	0.05
1254	34.098	5.62	0.05
1256	36.123	5.62	0.05

1258	38.265	5.62	0 05
1300	40.108	5.62	0.05
1302	42.202	5.62	0.05
1304	44 160	5.62	0 05
1306	46.160	5.62	0.06
1308	48.160	5.62	0.06
1310	50.188	5.62	0.06
1312	52.113	5.61	0.06
1314	54.113	5.61	0.06
1316	56.113	5.61	0.06
1318	58.113	5.61	0.06
1320	60.113	5.61	0.06
1322	62.238	5.61	0.06
1324	64.113	5.61	0.06
1326	66.113	5.61	0.06
1328	68.113	5.61	0.06
1330	70.113	5.61	0 06
1332	72.113	5.61	0.06
1334	74.113	5.61	0.06
1336	76.133	5.60	0.07
1338	78.113	5.61	0.06
1340	80.113	5.60	0.07
1342	82.212	5.60	0.07
1344	84.113	5.60	0.07
1346	86.105	5.60	0.07
1348	88.113	5.60	0.07
1350	90.113	5.60	0.07
1352	92.245	5.60	0.07
1354	94.113	5.60	0.07
1356	96.113	5.60	0.07
1358	98.113	5.60	0.07
1420	120.110	5.59	0.08
1440	140.250	5.59	0.08
1500	160.110	5.59	0.08
1520	180.030	5.59	0.08
1540	200.120	5.58	0.09
1559	219.980	5.59	0.08

Average level: 5.60



Input 9 (Δfeet)
0
1
Time (min)
.1
1
10
100
1E3
1E4
1E5



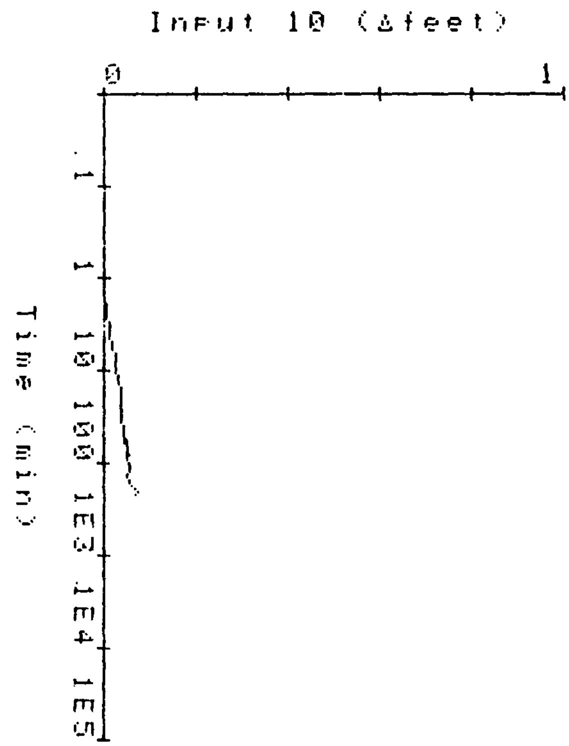
Input 9 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

Input 10 (feet):

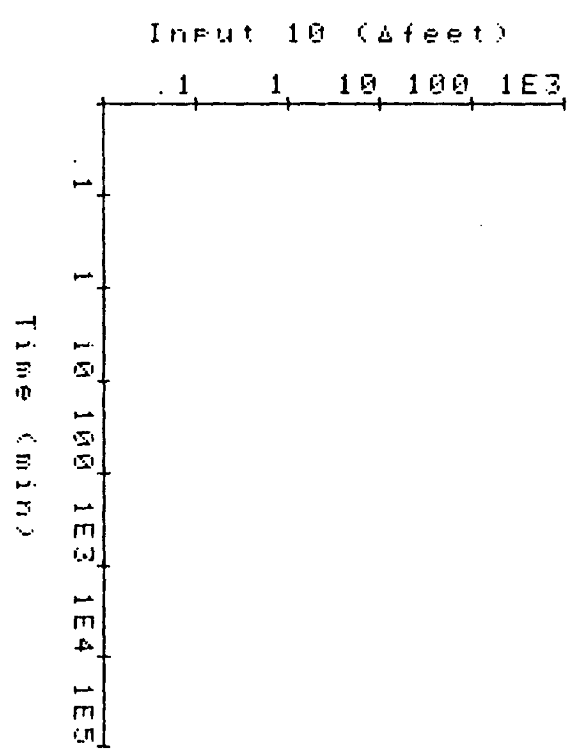
Time	ET (min)	level	Δlevel
1220	0.000	7.05	0.00
1220	0.017	7.05	0.00
1220	0.034	7.05	0.00
1220	0.050	7.05	0.00
1220	0.067	7.05	0.00
1220	0.084	7.05	0.00
1220	0.100	7.05	0.00
1220	0.117	7.05	0.00
1220	0.134	7.05	0.00
1220	0.150	7.05	0.00
1220	0.167	7.05	0.00
1220	0.257	7.05	0.00
1220	0.341	7.05	0.00
1220	0.424	7.05	0.00
1220	0.507	7.05	0.00
1220	0.591	7.05	0.00
1220	0.674	7.05	0.00
1220	0.757	7.05	0.00
1220	0.841	7.05	0.00
1220	0.924	7.05	0.00
1221	1.007	7.05	0.00
1221	1.417	7.05	0.00
1221	1.750	7.05	0.00
1222	2.084	7.04	0.01
1222	2.417	7.04	0.01
1222	2.750	7.04	0.01
1223	3.084	7.04	0.01
1223	3.417	7.04	0.01
1223	3.750	7.04	0.01
1224	4.084	7.04	0.01
1224	4.417	7.04	0.01
1224	4.750	7.03	0.02
1225	5.084	7.03	0.02
1225	5.417	7.03	0.02
1225	5.750	7.03	0.02
1226	6.084	7.03	0.02
1226	6.417	7.03	0.02
1226	6.750	7.03	0.02
1227	7.084	7.03	0.02
1227	7.417	7.03	0.02
1227	7.750	7.03	0.02
1228	8.084	7.03	0.02
1228	8.417	7.03	0.02
1228	8.750	7.02	0.03
1229	9.084	7.02	0.03
1229	9.417	7.02	0.03
1229	9.750	7.02	0.03
1230	10.084	7.02	0.03
1232	12.111	7.02	0.03

1234	14.111	7.02	0.03
1236	16.099	7.01	0.04
1238	18.098	7.01	0.04
1240	20.098	7.01	0.04
1242	22.098	7.02	0.03
1244	24.098	7.01	0.04
1246	26.098	7.01	0.04
1248	28.098	7.01	0.04
1250	30.098	7.01	0.04
1252	32.098	7.01	0.04
1254	34.098	7.01	0.04
1256	36.123	7.01	0.04
1258	38.265	7.01	0.04
1300	40.108	7.01	0.04
1302	42.202	7.01	0.04
1304	44.160	7.01	0.04
1306	46.160	7.01	0.04
1308	48.160	7.00	0.05
1310	50.188	7.00	0.05
1312	52.113	7.00	0.05
1314	54.113	7.00	0.05
1316	56.113	7.00	0.05
1318	58.113	7.00	0.05
1320	60.113	7.00	0.05
1322	62.238	7.00	0.05
1324	64.113	7.00	0.05
1326	66.113	7.00	0.05
1328	68.113	7.00	0.05
1330	70.113	7.00	0.05
1332	72.113	7.00	0.05
1334	74.113	7.00	0.05
1336	76.133	7.00	0.05
1338	78.113	7.00	0.05
1340	80.113	7.00	0.05
1342	82.212	7.00	0.05
1344	84.113	7.00	0.05
1346	86.105	7.00	0.05
1348	88.113	7.00	0.05
1350	90.113	7.00	0.05
1352	92.245	7.00	0.05
1354	94.113	7.00	0.05
1356	96.113	7.00	0.05
1358	98.113	7.00	0.05
1420	120.110	7.00	0.05
1440	140.250	7.00	0.05
1500	160.110	6.99	0.06
1520	180.030	6.99	0.06
1540	200.120	6.97	0.08
1559	219.980	6.98	0.07

Average level: 7.00



Input 10 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (min)



Input 10 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

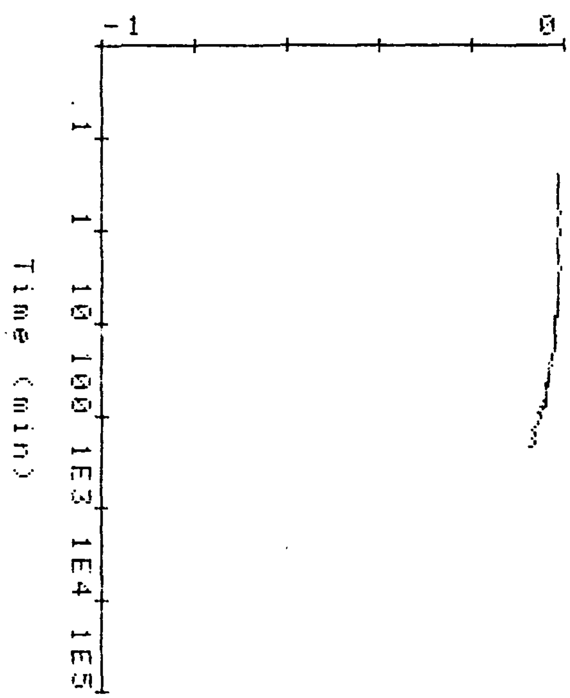
Input 11 (feet):

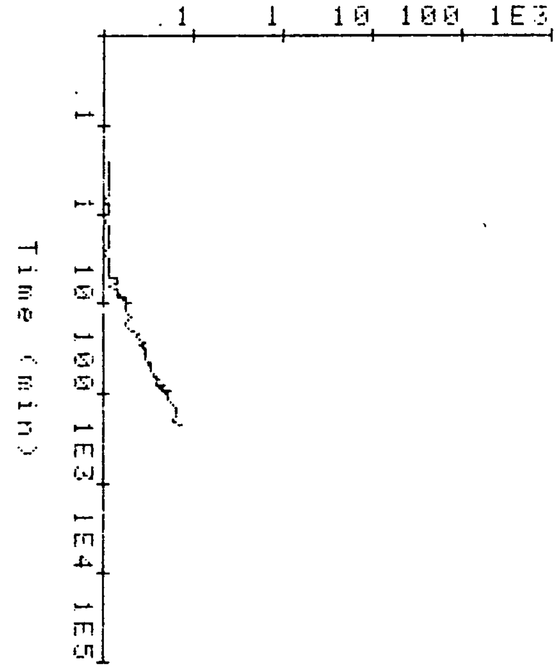
Time	ET (min)	level	Δlevel
1220	0.000	7.05	0.00
1220	0.257	7.06	-0.01
1220	0.341	7.06	-0.01
1220	0.424	7.06	-0.01
1220	0.507	7.06	-0.01
1220	0.591	7.06	-0.01
1220	0.674	7.06	-0.01
1220	0.757	7.06	-0.01
1220	0.841	7.06	-0.01
1220	0.924	7.06	-0.01
1221	1.007	7.06	-0.01
1221	1.417	7.06	-0.01
1221	1.750	7.06	-0.01
1222	2.084	7.06	-0.01
1222	2.417	7.06	-0.01
1222	2.750	7.06	-0.01
1223	3.084	7.06	-0.01
1223	3.417	7.06	-0.01
1223	3.750	7.06	-0.01
1224	4.084	7.06	-0.01
1224	4.417	7.06	-0.01
1224	4.750	7.06	-0.01
1225	5.084	7.06	-0.01
1225	5.417	7.06	-0.01
1225	5.750	7.06	-0.01
1226	6.084	7.06	-0.01
1226	6.417	7.06	-0.01
1226	6.750	7.06	-0.01
1227	7.084	7.06	-0.01
1227	7.417	7.06	-0.01
1227	7.750	7.06	-0.01
1228	8.084	7.06	-0.01
1228	8.417	7.07	-0.02
1228	8.750	7.06	-0.01
1229	9.084	7.07	-0.02
1229	9.417	7.07	-0.02
1229	9.750	7.07	-0.02
1230	10.084	7.07	-0.02
1232	12.111	7.07	-0.02
1234	14.111	7.07	-0.02
1236	16.099	7.07	-0.02
1238	18.098	7.07	-0.02
1240	20.098	7.07	-0.02
1242	22.098	7.08	-0.03
1244	24.098	7.07	-0.02
1246	26.098	7.08	-0.03
1248	28.099	7.08	-0.03
1250	30.098	7.08	-0.03
1252	32.098	7.08	-0.03
1254	34.098	7.08	-0.03
1256	36.123	7.08	-0.03
1258	38.265	7.08	-0.03
1300	40.108	7.08	-0.03
1302	42.202	7.08	-0.03
1304	44.160	7.08	-0.03
1306	46.160	7.08	-0.03
1308	48.160	7.08	-0.03
1310	50.188	7.08	-0.03
1312	52.113	7.08	-0.03
1314	54.113	7.08	-0.03
1316	56.113	7.08	-0.03
1318	58.113	7.08	-0.03

1320	60.113	7.09	-0.04
1322	62.238	7.09	-0.04
1324	64.113	7.09	-0.04
1326	66.113	7.09	-0.04
1328	68.113	7.09	-0.04
1330	70.113	7.09	-0.04
1332	72.113	7.09	-0.04
1334	74.113	7.09	-0.04
1336	76.133	7.09	-0.04
1338	78.113	7.09	-0.04
1340	80.113	7.09	-0.04
1342	82.212	7.10	-0.05
1344	84.113	7.10	-0.05
1346	86.105	7.10	-0.05
1348	88.113	7.09	-0.04
1350	90.113	7.10	-0.05
1352	92.245	7.10	-0.05
1354	94.113	7.10	-0.05
1356	96.113	7.11	-0.06
1358	98.113	7.10	-0.05
1420	120.110	7.11	-0.06
1440	140.250	7.12	-0.07
1500	160.110	7.11	-0.06
1520	180.030	7.12	-0.07
1540	200.120	7.11	-0.06
1559	219.980	7.12	-0.07

Average level: 7.10

Input 11 (Δfeet)



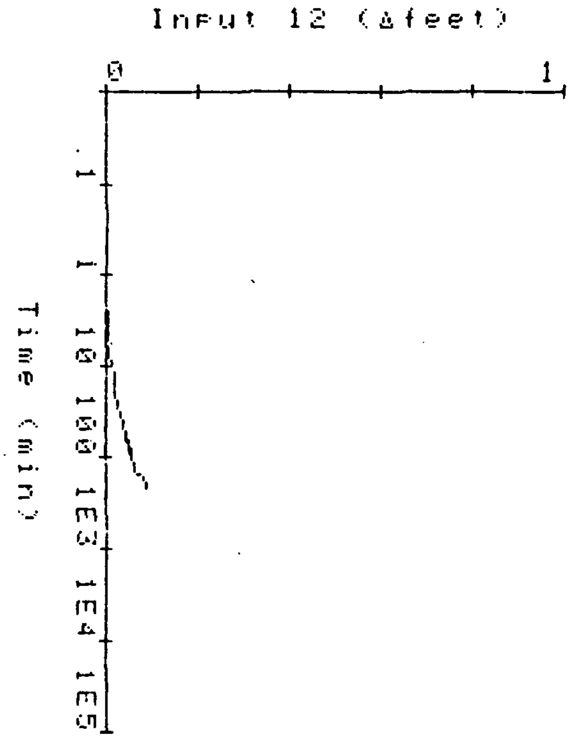


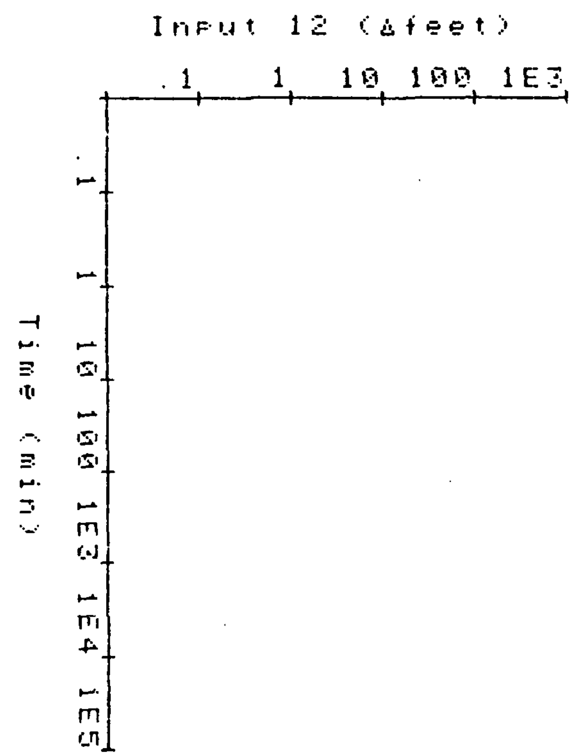
Input 12 (feet):

Time	ET (min)	level	Δlevel
1220	0.000	7.56	0.00
1220	0.257	7.56	0.00
1220	0.341	7.56	0.00
1220	0.424	7.56	0.00
1220	0.507	7.56	0.00
1220	0.591	7.56	0.00
1220	0.674	7.56	0.00
1220	0.757	7.56	0.00
1220	0.841	7.56	0.00
1220	0.924	7.56	0.00
1221	1.007	7.56	0.00
1221	1.417	7.56	0.00
1221	1.750	7.56	0.00
1222	2.084	7.56	0.00
1222	2.417	7.56	0.00
1222	2.750	7.55	0.01
1223	3.084	7.55	0.01
1223	3.417	7.55	0.01
1223	3.750	7.55	0.01
1224	4.084	7.55	0.01
1224	4.417	7.55	0.01
1224	4.750	7.55	0.01
1225	5.084	7.55	0.01
1225	5.417	7.55	0.01
1225	5.750	7.55	0.01
1226	6.084	7.55	0.01
1226	6.417	7.55	0.01
1226	6.750	7.55	0.01

1227	7.084	7.55	0.01
1227	7.417	7.55	0.01
1227	7.750	7.55	0.01
1228	8.084	7.55	0.01
1228	8.417	7.55	0.01
1228	8.750	7.55	0.01
1229	9.084	7.55	0.01
1229	9.417	7.55	0.01
1229	9.750	7.55	0.01
1230	10.084	7.55	0.01
1232	12.111	7.54	0.02
1234	14.111	7.54	0.02
1236	16.099	7.54	0.02
1238	18.098	7.54	0.02
1240	20.098	7.54	0.02
1242	22.098	7.54	0.02
1244	24.098	7.54	0.02
1246	26.098	7.54	0.02
1248	28.098	7.53	0.03
1250	30.098	7.53	0.03
1252	32.098	7.53	0.03
1254	34.098	7.53	0.03
1256	36.123	7.53	0.03
1258	38.265	7.53	0.03
1300	40.108	7.53	0.03
1302	42.202	7.53	0.03
1304	44.160	7.52	0.04
1306	46.160	7.52	0.04
1308	48.160	7.52	0.04
1310	50.188	7.52	0.04
1312	52.113	7.52	0.04
1314	54.113	7.52	0.04
1316	56.113	7.51	0.05
1318	58.113	7.52	0.04
1320	60.113	7.51	0.05
1322	62.238	7.51	0.05
1324	64.113	7.51	0.05
1326	66.113	7.51	0.05
1328	68.113	7.51	0.05
1330	70.113	7.51	0.05
1332	72.113	7.51	0.05
1334	74.113	7.51	0.05
1336	76.133	7.51	0.05
1338	78.113	7.51	0.05
1340	80.113	7.50	0.06
1342	82.212	7.50	0.06
1344	84.113	7.50	0.06
1346	86.105	7.50	0.06
1348	88.113	7.51	0.05
1350	90.113	7.50	0.06
1352	92.245	7.50	0.06
1354	94.113	7.50	0.06
1356	96.113	7.51	0.05
1358	98.113	7.50	0.06
1420	120.110	7.50	0.06
1440	140.250	7.50	0.06
1500	160.110	7.48	0.08
1520	180.030	7.48	0.08
1540	200.120	7.47	0.09
1559	219.980	7.47	0.09

Average level: 7.50


Input 12 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

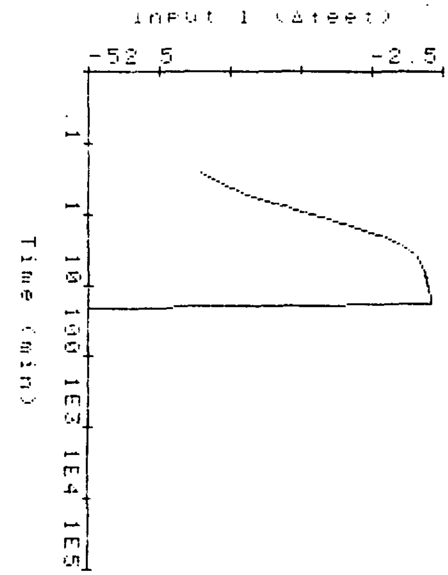

Input 12 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

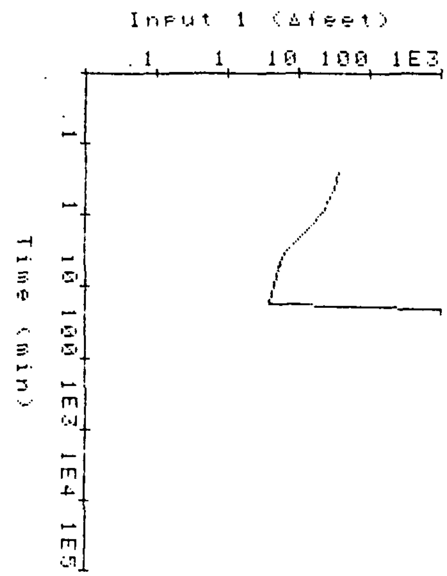
________RECOVERY REPORT________

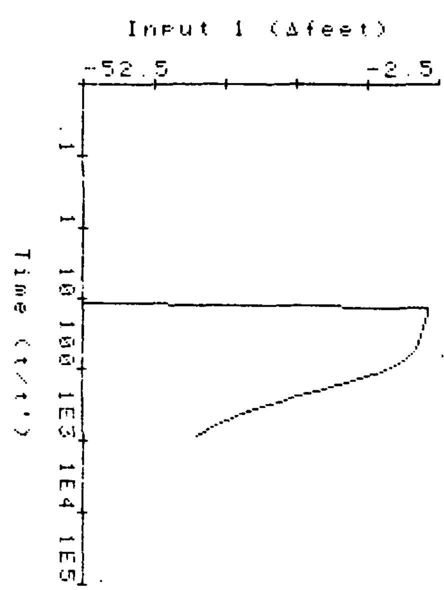
Started at 1559
Lasted 23.735 min

Input 1 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	117.55	-36.55
1600	0.341	115.20	-34.20
1600	0.424	113.04	-32.04
1600	0.507	111.01	-30.01
1600	0.591	109.13	-28.13
1600	0.674	107.37	-26.37
1600	0.757	105.72	-24.72
1600	0.841	104.22	-23.22
1600	0.924	102.80	-21.81
1600	1.007	101.50	-20.50
1601	1.417	96.39	-15.39
1601	1.750	93.51	-12.51
1602	2.084	91.47	-10.47
1602	2.417	90.01	-9.01
1602	2.750	88.98	-7.98
1603	3.084	88.22	-7.22
1603	3.417	87.69	-6.69
1603	3.750	87.29	-6.29
1604	4.084	86.99	-5.99
1604	4.417	86.76	-5.76
1604	4.750	86.58	-5.58
1605	5.084	86.43	-5.43
1605	5.417	86.30	-5.30
1605	5.750	86.20	-5.20
1606	6.084	86.12	-5.12
1606	6.417	86.05	-5.05
1606	6.750	85.98	-4.98
1607	7.084	85.90	-4.90
1607	7.417	85.85	-4.85
1607	7.750	85.80	-4.80
1608	8.084	85.75	-4.75
1608	8.417	85.69	-4.69
1608	8.750	85.65	-4.65
1609	9.084	85.62	-4.62
1609	9.417	85.58	-4.58
1609	9.750	85.53	-4.53
1610	10.084	85.49	-4.49
1612	12.117	85.32	-4.32
1614	14.117	85.16	-4.16
1616	16.117	85.03	-4.03
1618	18.117	84.92	-3.92
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

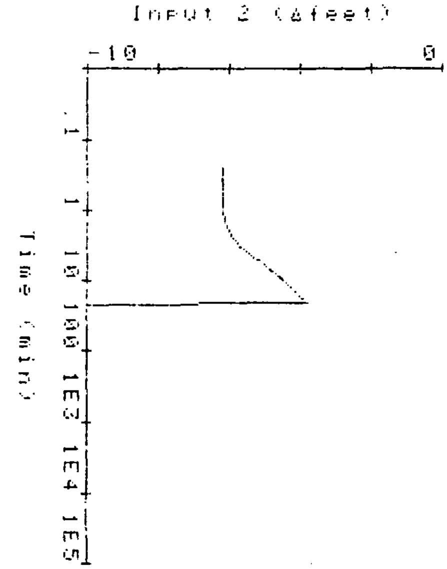

Input 1 (Δfeet)
-52.5
-2.5
Time (min)
.1
1
10
100
1E3
1E4
1E5


Input 1 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

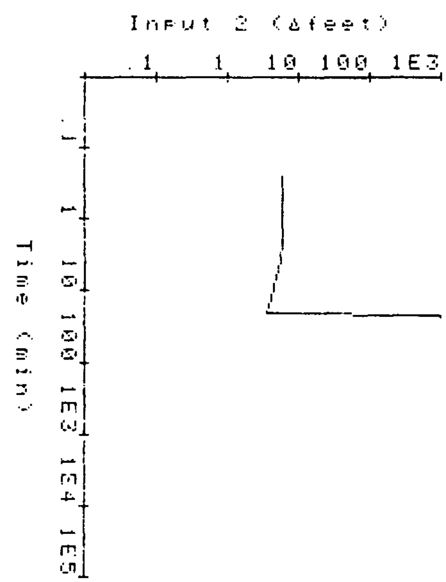

Input 1 (Δfeet)
-52.5
-2.5
Time (t/t')
.1
1
10
100
1E3
1E4
1E5

Input 2 (feet):

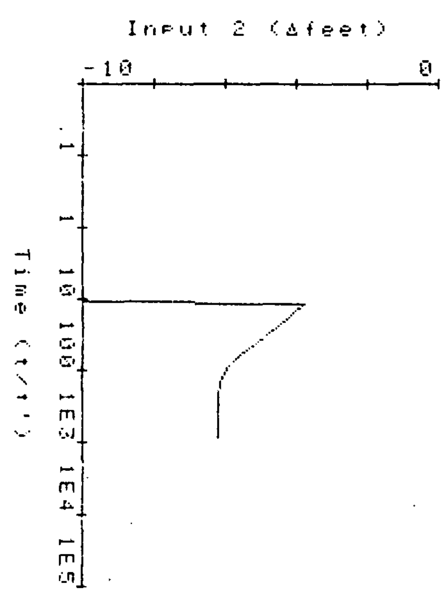
Time	ET (min)	level	Δlevel
1600	0.257	90.83	-6.19
1600	0.341	90.83	-6.19
1600	0.424	90.85	-6.21
1600	0.507	90.85	-6.21
1600	0.591	90.85	-6.21
1600	0.674	90.85	-6.21
1600	0.757	90.85	-6.21
1600	0.841	90.85	-6.21
1600	0.924	90.83	-6.19
1600	1.007	90.83	-6.19
1601	1.417	90.79	-6.15
1601	1.750	90.73	-6.09
1602	2.084	90.66	-6.02
1602	2.417	90.57	-5.93
1602	2.750	90.48	-5.84
1603	3.084	90.38	-5.74
1603	3.417	90.29	-5.65
1603	3.750	90.21	-5.57
1604	4.084	90.10	-5.46
1604	4.417	90.02	-5.38
1604	4.750	89.94	-5.30
1605	5.084	89.86	-5.22
1605	5.417	89.78	-5.14
1605	5.750	89.71	-5.07
1606	6.084	89.65	-5.01
1606	6.417	89.58	-4.94
1606	6.750	89.52	-4.88
1607	7.084	89.48	-4.84
1607	7.417	89.42	-4.78
1607	7.750	89.38	-4.74
1608	8.084	89.33	-4.69
1608	8.417	89.28	-4.64
1608	8.750	89.23	-4.59
1609	9.084	89.20	-4.56
1609	9.417	89.16	-4.52
1609	9.750	89.13	-4.49
1610	10.084	89.09	-4.45
1612	12.117	88.90	-4.26
1614	14.117	88.75	-4.11
1616	16.117	88.62	-3.98
1618	18.117	88.52	-3.88
1620	20.117	88.40	-3.76
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99



Input 2 (Δfeet)
-10
0
.1
1
10
100
1E3
1E4
1E5
Time (min)



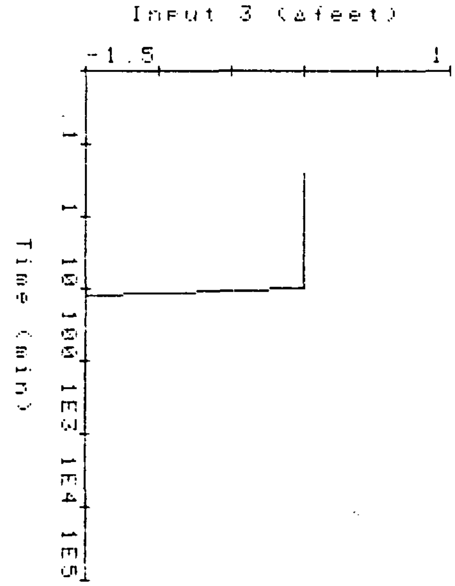
Input 2 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

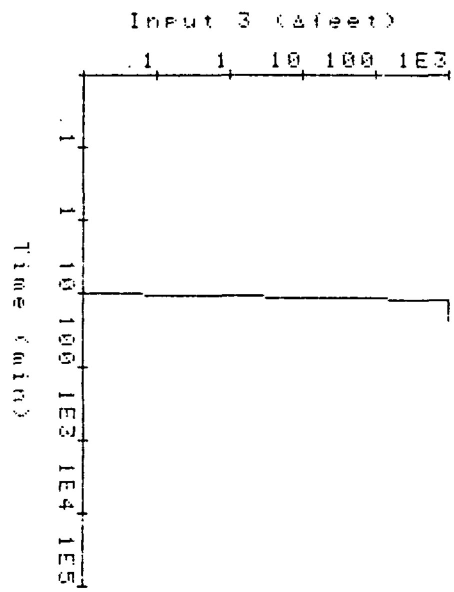


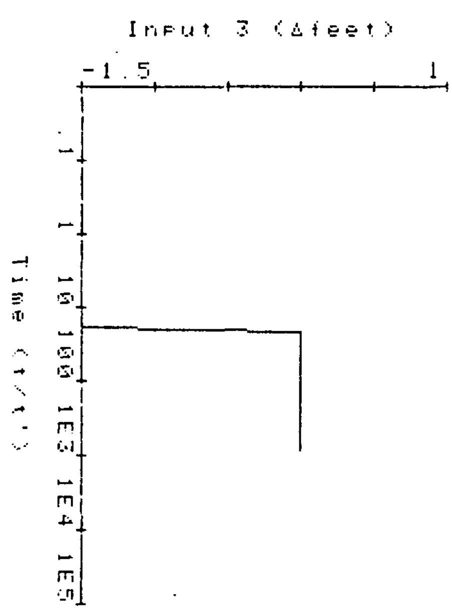
Input 2 (Δfeet)
-10
0
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

Input 3 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	0.00	-0.00
1600	0.341	0.00	-0.00
1600	0.424	0.00	0.00
1600	0.507	-0.00	0.00
1600	0.591	0.00	0.00
1600	0.674	-0.00	0.00
1600	0.757	-0.00	0.00
1600	0.841	0.00	0.00
1600	0.924	-0.00	0.00
1600	1.007	0.00	0.00
1601	1.417	0.00	-0.00
1601	1.750	-0.00	0.00
1602	2.084	0.00	-0.00
1602	2.417	0.00	-0.00
1602	2.750	0.00	0.00
1603	3.084	0.00	0.00
1603	3.417	0.00	0.00
1603	3.750	0.00	-0.00
1604	4.084	0.00	0.00
1604	4.417	-0.00	0.00
1604	4.750	0.00	0.00
1605	5.084	0.00	0.00
1605	5.417	0.00	0.00
1605	5.750	0.00	0.00
1606	6.084	0.00	0.00
1606	6.417	-0.00	0.00
1606	6.750	0.00	0.00
1607	7.084	-0.00	0.00
1607	7.417	0.00	0.00
1607	7.750	-0.00	0.00
1608	8.084	0.00	0.00
1608	8.417	-0.00	0.00
1608	8.750	-0.00	0.00
1609	9.084	0.00	-0.00
1609	9.417	0.00	0.00
1609	9.750	0.00	0.00
1610	10.084	0.00	0.00
1612	12.117	-999.99	-999.99
1614	14.117	-999.99	-999.99
1616	16.117	-999.99	-999.99
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999 99	-999.99
1623	23.735	-999.99	-999.99

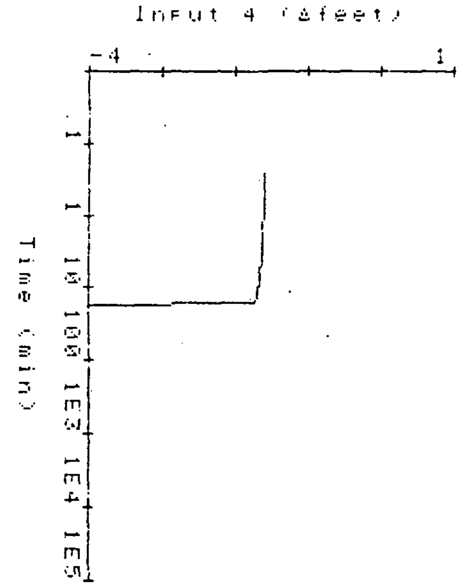

Input 3 (Δfeet)
-1.5
1
Time (min)
.1
1
10
100
1E3
1E4
1E5

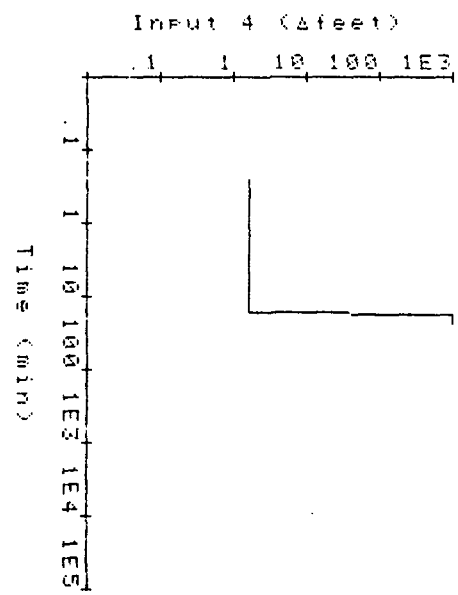

Input 3 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

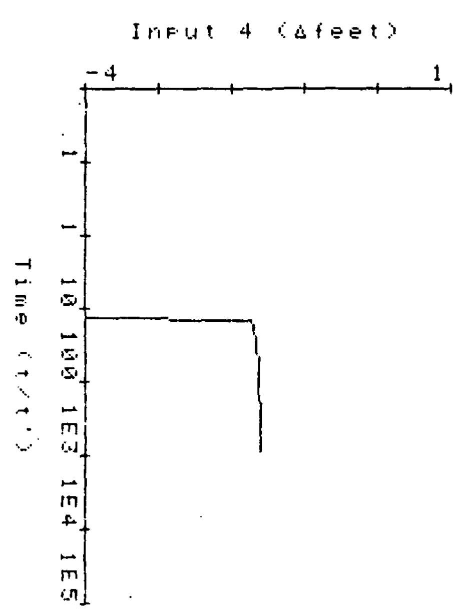

Input 3 (Δfeet)
-1.5
1
Time (t/t')
.1
1
10
100
1E3
1E4
1E5

Input 4 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	83.91	-1.60
1600	0.341	83.91	-1.60
1600	0.424	83.92	-1.61
1600	0.507	83.92	-1.61
1600	0.591	83.92	-1.61
1600	0.674	83.92	-1.61
1600	0.757	83.92	-1.61
1600	0.841	83.92	-1.61
1600	0.924	83.92	-1.61
1600	1.007	83.92	-1.61
1601	1.417	83.92	-1.61
1601	1.750	83.93	-1.61
1602	2.084	83.93	-1.62
1602	2.417	83.93	-1.62
1602	2.750	83.93	-1.62
1603	3.084	83.93	-1.62
1603	3.417	83.94	-1.63
1603	3.750	83.94	-1.63
1604	4.084	83.94	-1.63
1604	4.417	83.95	-1.64
1604	4.750	83.95	-1.64
1605	5.084	83.95	-1.64
1605	5.417	83.95	-1.64
1605	5.750	83.95	-1.64
1606	6.084	83.96	-1.65
1606	6.417	83.96	-1.65
1606	6.750	83.96	-1.65
1607	7.084	83.96	-1.65
1607	7.417	83.97	-1.66
1607	7.750	83.97	-1.66
1608	8.084	83.97	-1.66
1608	8.417	83.97	-1.66
1608	8.750	83.97	-1.66
1609	9.084	83.97	-1.66
1609	9.417	83.98	-1.67
1609	9.750	83.98	-1.67
1610	10.084	83.98	-1.67
1612	12.117	83.99	-1.68
1614	14.117	84.01	-1.70
1616	16.117	84.02	-1.71
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

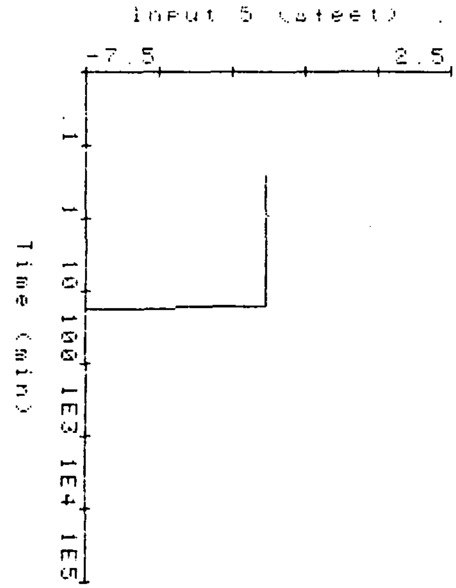

Input 4 (Δfeet)
-4
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

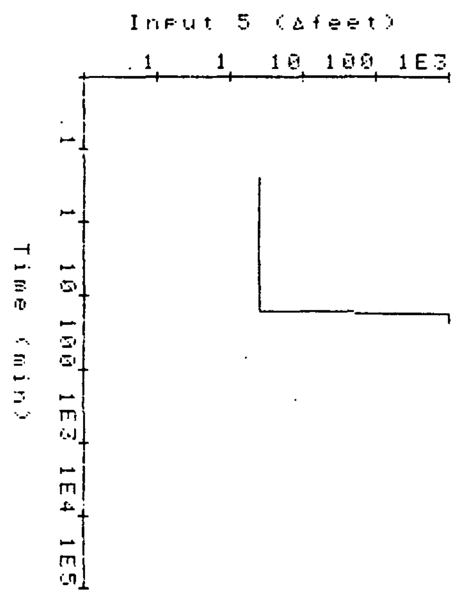

Input 4 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

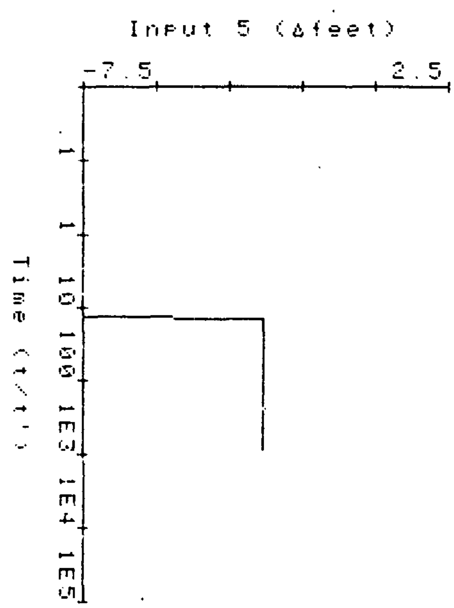

Input 4 (Δfeet)
-4
1
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

Input 5 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	82.51	-2.54
1600	0.341	82.51	-2.54
1600	0.424	82.51	-2.54
1600	0.507	82.51	-2.54
1600	0.591	82.51	-2.54
1600	0.674	82.51	-2.54
1600	0.757	82.51	-2.54
1600	0.841	82.51	-2.54
1600	0.924	82.50	-2.53
1600	1.007	82.51	-2.53
1601	1.417	82.52	-2.54
1601	1.750	82.52	-2.55
1602	2.084	82.52	-2.55
1602	2.417	82.52	-2.55
1602	2.750	82.52	-2.55
1603	3.084	82.53	-2.56
1603	3.417	82.53	-2.56
1603	3.750	82.53	-2.56
1604	4.084	82.53	-2.56
1604	4.417	82.53	-2.56
1604	4.750	82.53	-2.56
1605	5.084	82.53	-2.56
1605	5.417	82.53	-2.56
1605	5.750	82.53	-2.56
1606	6.084	82.53	-2.56
1606	6.417	82.54	-2.56
1606	6.750	82.53	-2.56
1607	7.084	82.54	-2.56
1607	7.417	82.54	-2.56
1607	7.750	82.54	-2.56
1608	8.084	82.54	-2.56
1608	8.417	82.54	-2.56
1608	8.750	82.54	-2.57
1609	9.084	82.54	-2.57
1609	9.417	82.54	-2.57
1609	9.750	82.54	-2.57
1610	10.084	82.54	-2.57
1612	12.117	82.54	-2.57
1614	14.117	82.54	-2.57
1616	16.117	82.54	-2.57
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

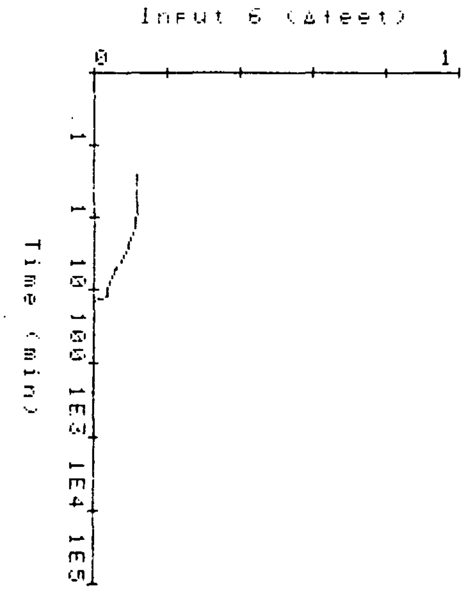

Input 5 (Δfeet)
-7.5
2.5
Time (min)
.1
1
10
100
1E3
1E4
1E5

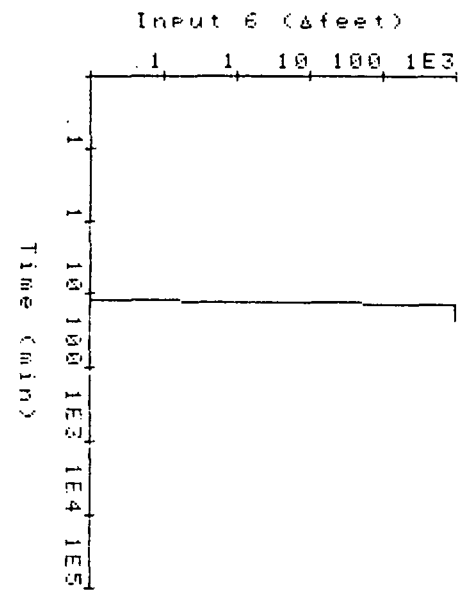

Input 5 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

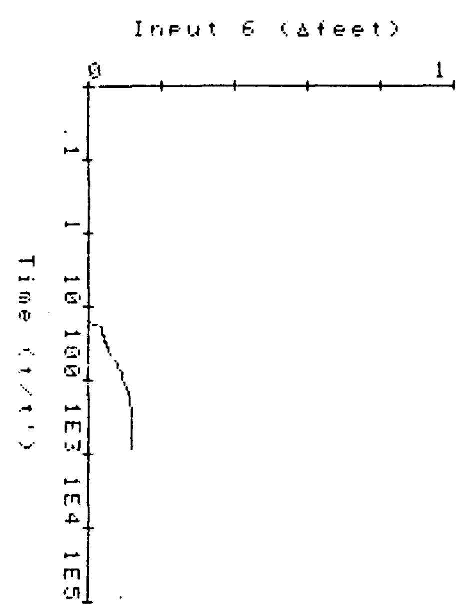

Input 5 (Δfeet)
-7.5
2.5
Time (t/t')
.1
1
10
100
1E3
1E4
1E5

Input 6 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	45.96	0.12
1600	0.341	45.96	0.12
1600	0.424	45.96	0.12
1600	0.507	45.96	0.12
1600	0.591	45.96	0.12
1600	0.674	45.96	0.12
1600	0.757	45.96	0.12
1600	0.841	45.96	0.12
1600	0.924	45.96	0.12
1600	1.007	45.96	0.11
1601	1.417	45.96	0.11
1601	1.750	45.97	0.11
1602	2.084	45.97	0.10
1602	2.417	45.98	0.10
1602	2.750	45.98	0.09
1603	3.084	45.99	0.09
1603	3.417	45.99	0.08
1603	3.750	46.00	0.08
1604	4.084	46.00	0.08
1604	4.417	46.00	0.07
1604	4.750	46.01	0.06
1605	5.084	46.01	0.06
1605	5.417	46.02	0.06
1605	5.750	46.02	0.06
1606	6.084	46.02	0.06
1606	6.417	46.02	0.05
1606	6.750	46.03	0.05
1607	7.084	46.03	0.05
1607	7.417	46.03	0.05
1607	7.750	46.03	0.05
1608	8.084	46.03	0.04
1608	8.417	46.03	0.04
1608	8.750	46.03	0.04
1609	9.084	46.04	0.04
1609	9.417	46.04	0.04
1609	9.750	46.04	0.04
1610	10.084	46.04	0.03
1612	12.117	46.04	0.03
1614	14.117	-999.99	-999.99
1616	16.117	-999.99	-999.99
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

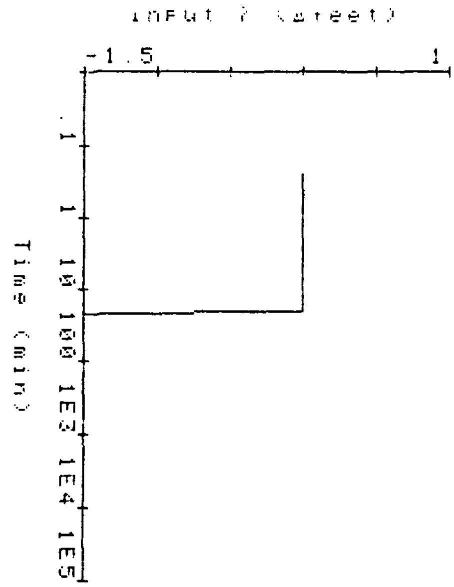

Input 6 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

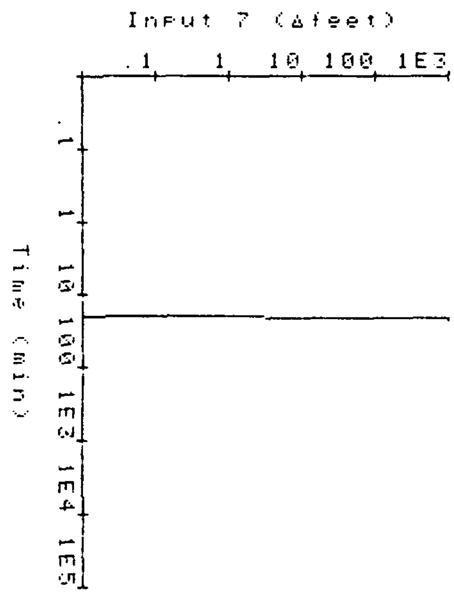

Input 6 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

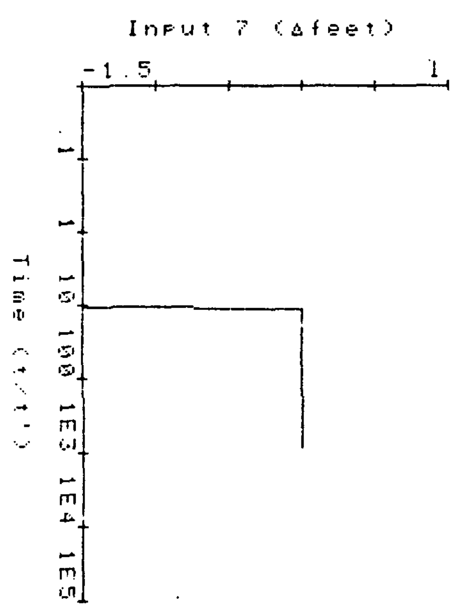

Input 6 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

Input 7 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	40.09	0.00
1600	0.341	40.09	0.00
1600	0.424	40.09	0.00
1600	0.507	40.09	0.00
1600	0.591	40.09	0.00
1600	0.674	40.09	0.00
1600	0.757	40.09	0.00
1600	0.841	40.09	0.00
1600	0.924	40.09	0.00
1600	1.007	40.09	0.00
1601	1.417	40.09	0.00
1601	1.750	40.09	0.00
1602	2.084	40.09	0.00
1602	2.417	40.09	0.00
1602	2.750	40.09	0.00
1603	3.084	40.09	0.00
1603	3.417	40.09	0.00
1603	3.750	40.09	0.00
1604	4.084	40.09	0.00
1604	4.417	40.09	0.00
1604	4.750	40.09	0.00
1605	5.084	40.09	0.00
1605	5.417	40.09	0.00
1605	5.750	40.09	0.00
1606	6.084	40.09	0.00
1606	6.417	40.09	0.00
1606	6.750	40.09	0.00
1607	7.084	40.09	0.00
1607	7.417	40.09	0.00
1607	7.750	40.09	0.00
1608	8.084	40.09	0.00
1608	8.417	40.09	0.00
1608	8.750	40.09	0.00
1609	9.084	40.09	0.00
1609	9.417	40.09	0.00
1609	9.750	40.09	0.00
1610	10.084	40.09	0.00
1612	12.117	40.09	0.00
1614	14.117	40.09	0.00
1616	16.117	40.09	0.00
1618	18.117	40.09	0.00
1620	20.117	40.09	0.00
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

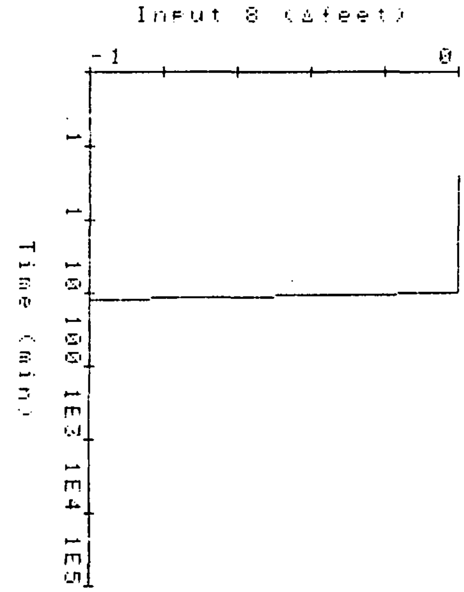

Input 7 (Δfeet)
-1.5
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

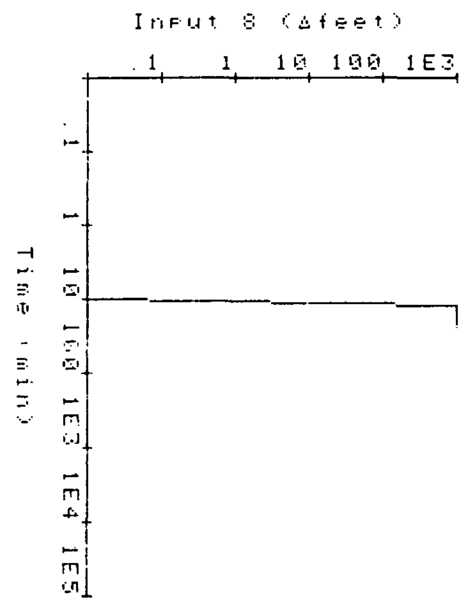

Input 7 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

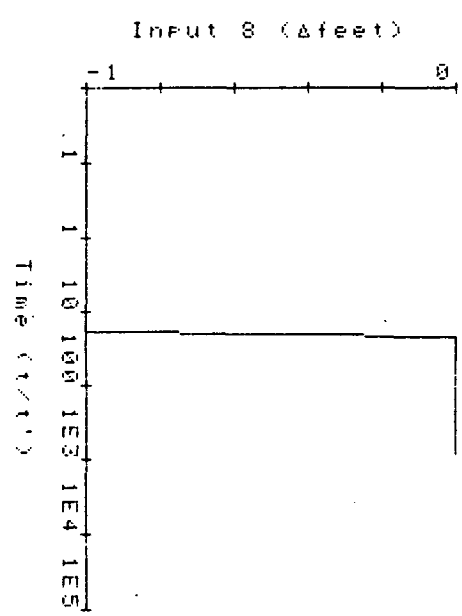

Input 7 (Δfeet)
-1.5
1
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

Input 6 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	38.82	0 00
1600	0.341	38.83	-0.00
1600	0.424	38.83	-0.00
1600	0.507	38.83	-0.00
1600	0.591	38.83	-0.00
1600	0.674	38.82	0.00
1600	0.757	38.83	-0.00
1600	0.841	38.83	-0.00
1600	0.924	38.83	-0.00
1600	1.007	38.82	0.00
1601	1.417	38 83	-0.00
1601	1.750	38.83	-0.00
1602	2.084	38.83	-0.00
1602	2.417	38.82	0.00
1602	2.750	38.83	-0.00
1603	3.084	38.83	-0.00
1603	3.417	38.83	-0.00
1603	3.750	38.83	-0.00
1604	4.084	38.83	-0 00
1604	4.417	38.83	-0.00
1604	4.750	38.83	-0.00
1605	5.084	38.83	-0.00
1605	5.417	38.83	-0.00
1605	5.750	38.82	0.00
1606	6.084	38.83	-0.00
1606	6.417	38.83	-0.00
1606	6.750	38.82	0.00
1607	7.084	38.83	-0.00
1607	7.417	38.83	-0.00
1607	7.750	38.83	-0.00
1608	8.084	38.83	-0.00
1608	8.417	38.83	-0.00
1608	8.750	38.83	-0.00
1609	9.084	38.82	0.00
1609	9.417	38.83	-0.00
1609	9.750	38.83	-0.00
1610	10.084	38.83	-0.00
1612	12.117	-999.99	-999.99
1614	14.117	-999.99	-999.99
1616	16.117	-999.99	-999.99
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99

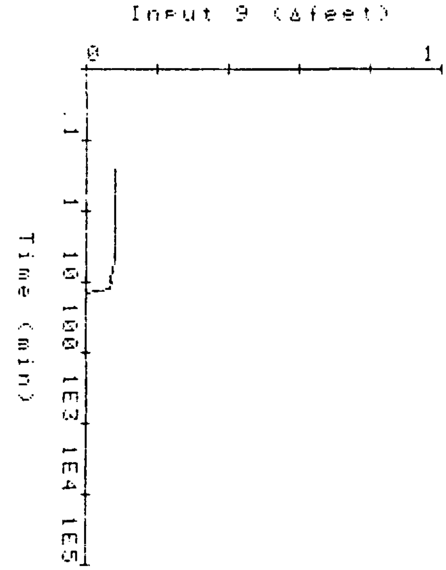

Input 8 (Δfeet)
-1
0
Time (min)
.1
1
10
100
1E3
1E4
1E5


Input 8 (Δfeet)
.1
1
10
100
1E3
Time (min)
.1
1
10
100
1E3
1E4
1E5

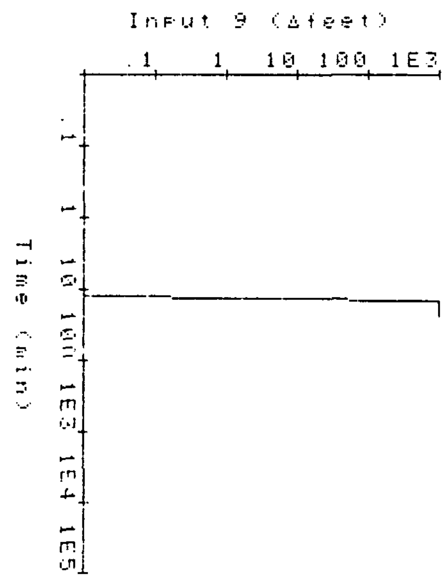

Input 8 (Δfeet)
-1
0
Time (t/t')
.1
1
10
100
1E3
1E4
1E5

Input 9 (feet):

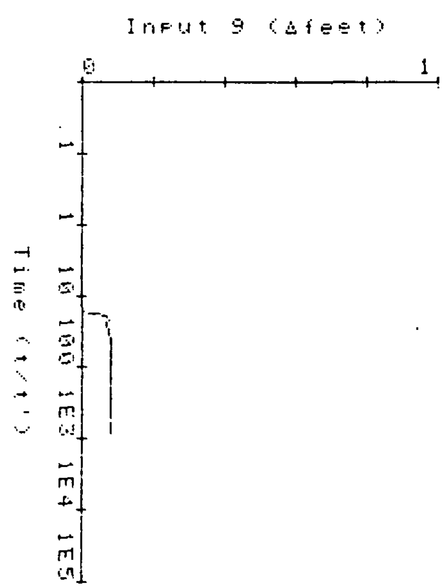
Time	ET (min)	level	Δlevel
1600	0.257	5.59	0.08
1600	0.341	5.59	0.08
1600	0.424	5.59	0.08
1600	0.507	5.59	0.08
1600	0.591	5.59	0.08
1600	0.674	5.59	0.08
1600	0.757	5.59	0.08
1600	0.841	5.59	0.08
1600	0.924	5.59	0.08
1600	1.007	5.59	0.08
1601	1.417	5.59	0.08
1601	1.750	5.59	0.08
1602	2.084	5.59	0.08
1602	2.417	5.59	0.08
1602	2.750	5.59	0.08
1603	3.084	5.59	0.08
1603	3.417	5.59	0.08
1603	3.750	5.59	0.08
1604	4.084	5.59	0.08
1604	4.417	5.59	0.08
1604	4.750	5.59	0.08
1605	5.084	5.59	0.08
1605	5.417	5.59	0.08
1605	5.750	5.59	0.08
1606	6.084	5.59	0.08
1606	6.417	5.59	0.08
1606	6.750	5.59	0.08
1607	7.084	5.60	0.07
1607	7.417	5.60	0.07
1607	7.750	5.60	0.07
1608	8.084	5.60	0.07
1608	8.417	5.60	0.07
1608	8.750	5.60	0.07
1609	9.084	5.60	0.07
1609	9.417	5.60	0.07
1609	9.750	5.60	0.07
1610	10.084	5.60	0.07
1612	12.117	5.60	0.07
1614	14.117	-999.99	-999.99
1616	16.117	-999.99	-999.99
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99



Input 9 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (min)



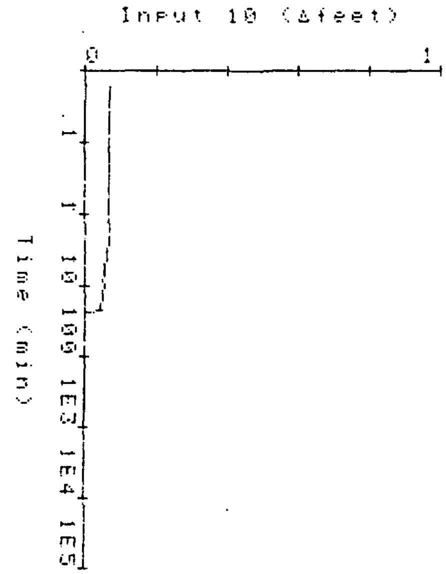
Input 9 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

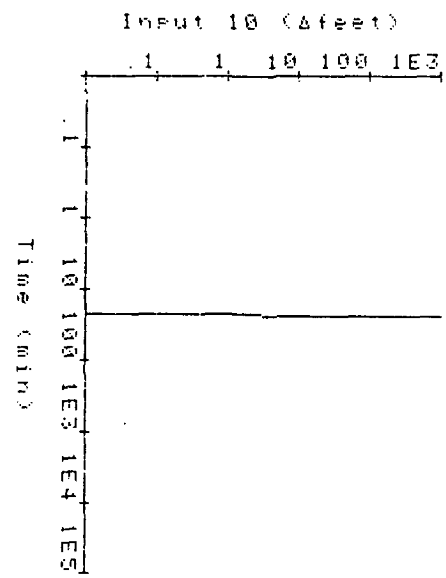


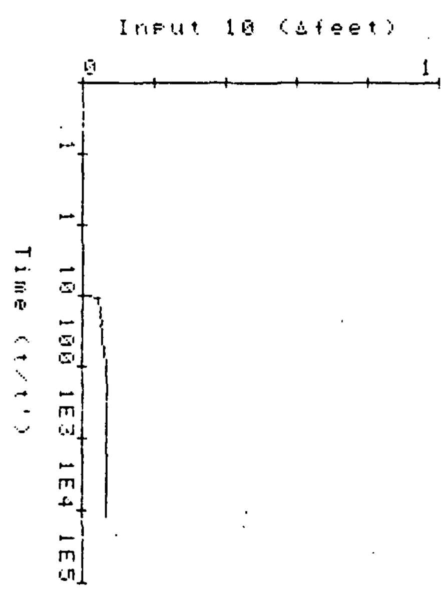
Input 9 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

Input 10 (feet):

Time	ET (min)	level	Δlevel
1600	0.017	6.98	0.07
1600	0.034	6.98	0.07
1600	0.050	6.98	0.07
1600	0.067	6.98	0.07
1600	0.084	6.98	0.07
1600	0.100	6.98	0.07
1600	0.117	6.98	0.07
1600	0.134	6.98	0.07
1600	0.150	6.98	0.07
1600	0.167	6.98	0.07
1600	0.257	6.98	0.07
1600	0.341	6.98	0.07
1600	0.424	6.98	0.07
1600	0.507	6.98	0.07
1600	0.591	6.98	0.07
1600	0.674	6.98	0.07
1600	0.757	6.98	0.07
1600	0.841	6.98	0.07
1600	0.924	6.98	0.07
1600	1.007	6.98	0.07
1601	1.417	6.98	0.07
1601	1.750	6.98	0.07
1602	2.084	6.98	0.07
1602	2.417	6.98	0.07
1602	2.750	6.98	0.07
1603	3.084	6.99	0.06
1603	3.417	6.99	0.06
1603	3.750	6.99	0.06
1604	4.084	6.99	0.06
1604	4.417	6.99	0.06
1604	4.750	6.99	0.06
1605	5.084	6.99	0.06
1605	5.417	7.00	0.05
1605	5.750	7.00	0.05
1606	6.084	7.00	0.05
1606	6.417	7.00	0.05
1606	6.750	7.00	0.05
1607	7.084	7.00	0.05
1607	7.417	7.00	0.05
1607	7.750	7.00	0.05
1608	8.084	7.00	0.05
1608	8.417	7.00	0.05
1608	8.750	7.00	0.05
1609	9.084	7.00	0.05
1609	9.417	7.00	0.05
1609	9.750	7.00	0.05
1610	10.084	7.00	0.05
1612	12.117	7.00	0.05
1614	14.117	7.00	0.05
1616	16.117	7.00	0.05
1618	18.117	7.00	0.05
1620	20.117	7.00	0.05
1622	22.117	7.00	0.05
1623	23.735	-999.99	-999.99

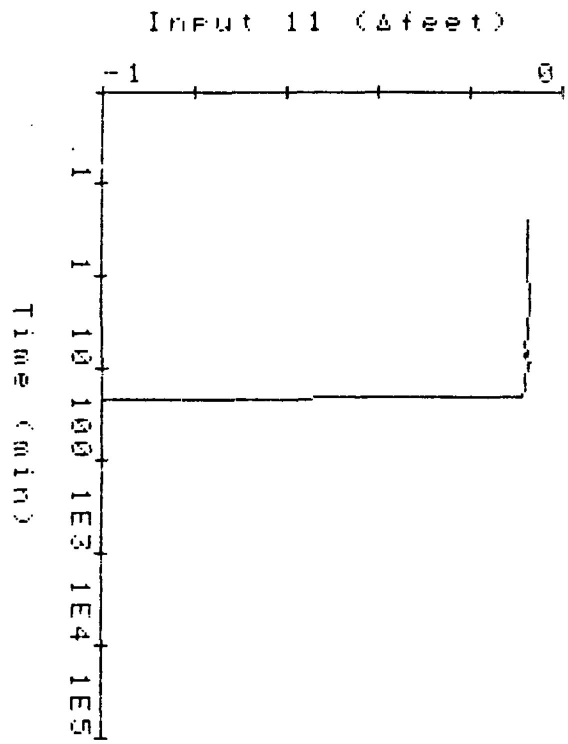

Input 10 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (min)

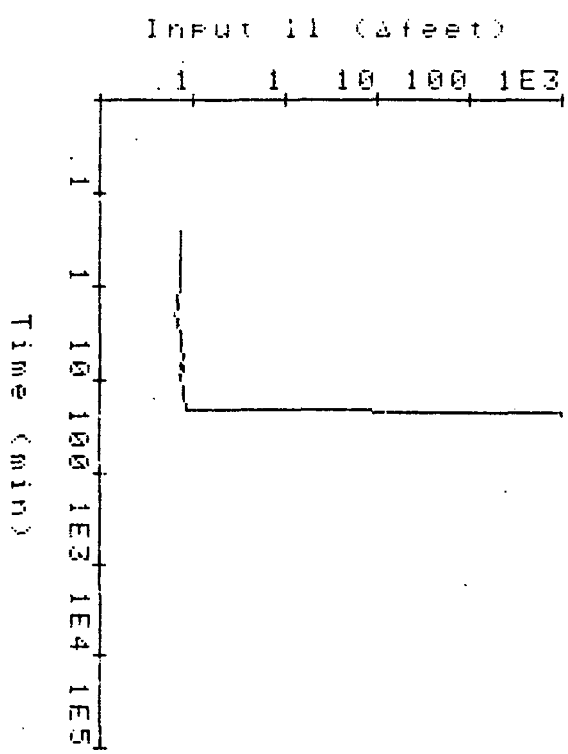

Input 10 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)


Input 10 (Δfeet)
0
1
.1
1
10
100
1E3
1E4
1E5
Time (t/t')

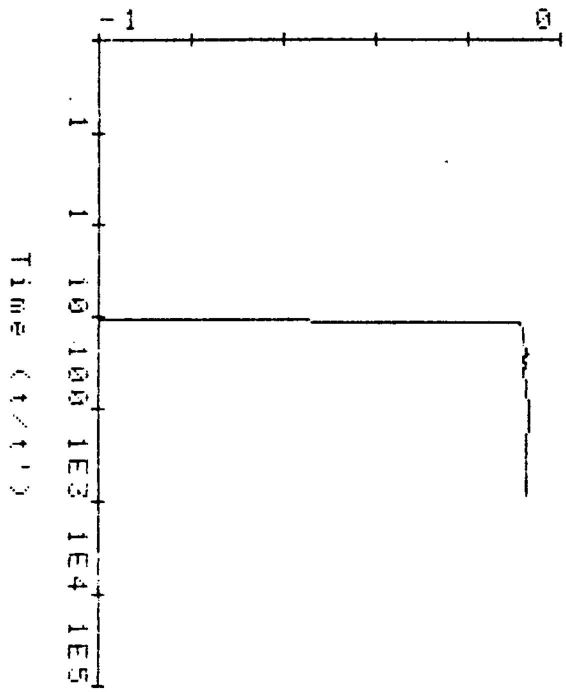
Input 11 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	7.12	-0.07
1600	0.341	7.12	-0.07
1600	0.424	7.12	-0.07
1600	0.507	7.12	-0.07
1600	0.591	7.12	-0.07
1600	0.674	7.12	-0.07
1600	0.757	7.12	-0.07
1600	0.841	7.12	-0.07
1600	0.924	7.12	-0.07
1600	1.007	7.12	-0.07
1601	1.417	7.12	-0.07
1601	1.750	7.12	-0.07
1602	2.084	7.12	-0.07
1602	2.417	7.12	-0.07
1602	2.750	7.12	-0.07
1603	3.084	7.12	-0.07
1603	3.417	7.13	-0.08
1603	3.750	7.13	-0.08
1604	4.084	7.12	-0.07
1604	4.417	7.13	-0.08
1604	4.750	7.13	-0.08
1605	5.084	7.13	-0.08
1605	5.417	7.13	-0.08
1605	5.750	7.13	-0.08
1606	6.084	7.13	-0.08
1606	6.417	7.13	-0.08
1606	6.750	7.13	-0.08
1607	7.084	7.13	-0.08
1607	7.417	7.13	-0.08
1607	7.750	7.13	-0.08
1608	8.084	7.13	-0.08
1608	8.417	7.12	-0.07
1608	8.750	7.12	-0.07
1609	9.084	7.12	-0.07
1609	9.417	7.12	-0.07
1609	9.750	7.12	-0.07
1610	10.084	7.13	-0.08
1612	12.117	7.13	-0.08
1614	14.117	7.13	-0.08
1616	16.117	7.13	-0.08
1618	18.117	7.13	-0.08
1620	20.117	7.14	-0.09
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99


Input 11 (Δfeet)
-1
0
.1
1
10
100
1E3
1E4
1E5
Time (min)


Input 11 (Δfeet)
.1
1
10
100
1E3
.1
1
10
100
1E3
1E4
1E5
Time (min)

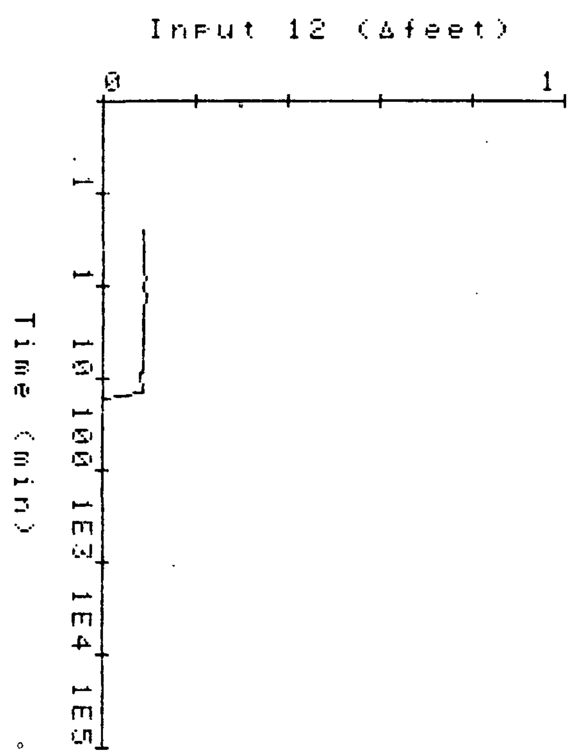
Input 11 (Δfeet)

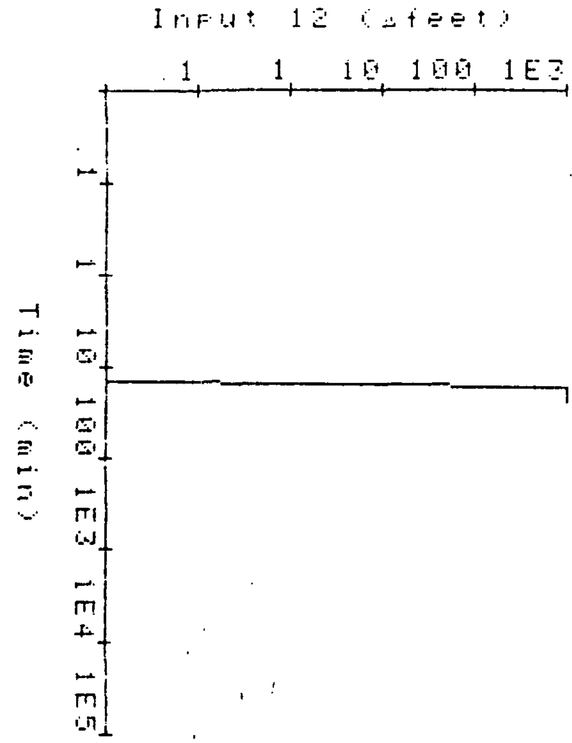


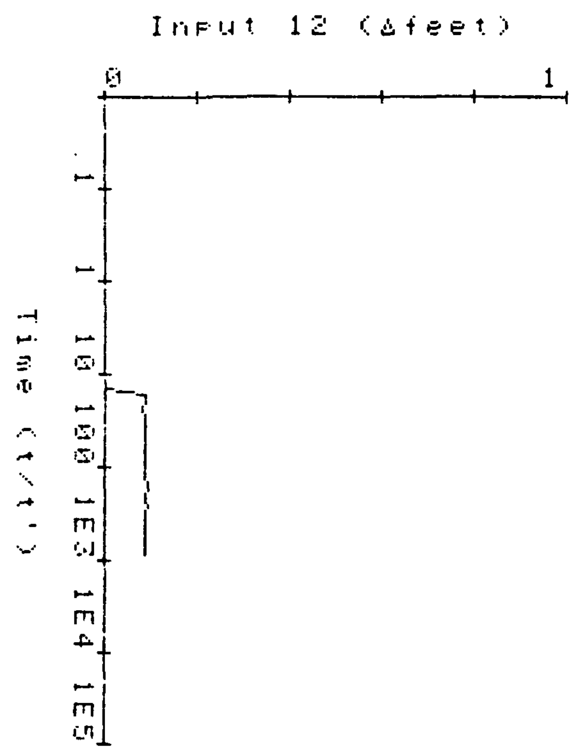
Input 12 (feet):

Time	ET (min)	level	Δlevel
1600	0.257	7.47	0.09
1600	0.341	7.47	0.09
1600	0.424	7.47	0.09
1600	0.507	7.47	0.09
1600	0.591	7.47	0.09
1600	0.674	7.47	0.09
1600	0.757	7.47	0.09
1600	0.841	7.47	0.09
1600	0.924	7.47	0.09
1600	1.007	7.47	0.09
1601	1.417	7.47	0.09
1601	1.750	7.47	0.09

1602	2.084	7.47	0.09
1602	2.417	7.47	0.09
1602	2.750	7.47	0.09
1603	3.084	7.47	0.09
1603	3.417	7.47	0.09
1603	3.750	7.47	0.09
1604	4.084	7.47	0.09
1604	4.417	7.47	0.09
1604	4.750	7.47	0.09
1605	5.084	7.47	0.09
1605	5.417	7.47	0.09
1605	5.750	7.47	0.09
1606	6.084	7.47	0.09
1606	6.417	7.47	0.09
1606	6.750	7.47	0.09
1607	7.084	7.47	0.09
1607	7.417	7.47	0.09
1607	7.750	7.47	0.09
1608	8.084	7.47	0.09
1608	8.417	7.47	0.09
1608	8.750	7.48	0.08
1609	9.084	7.48	0.08
1609	9.417	7.48	0.08
1609	9.750	7.48	0.08
1610	10.084	7.48	0.08
1612	12.117	7.47	0.09
1614	14.117	7.47	0.09
1616	16.117	-999.99	-999.99
1618	18.117	-999.99	-999.99
1620	20.117	-999.99	-999.99
1622	22.117	-999.99	-999.99
1623	23.735	-999.99	-999.99







SE200B manufactured by
In-situ, inc.
Laramie Wyoming

CALCULATIONS AND COMPUTATIONS

SHEET ___ OF ___

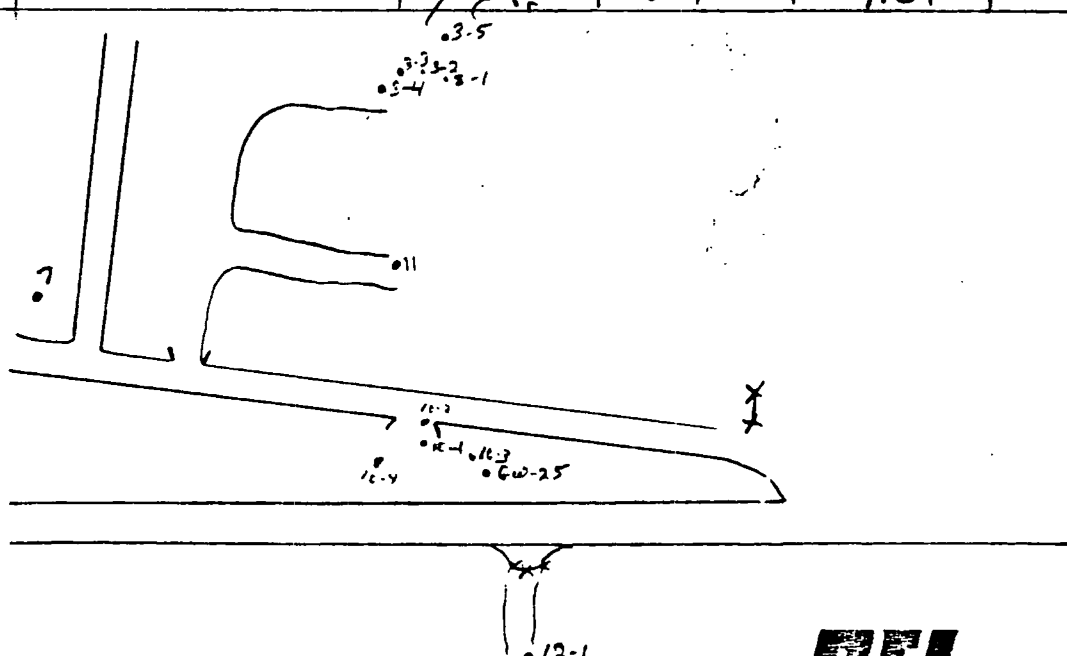
PROJECT: ______ JOB NO.: ______

SUBJECT: FRENCH LTD WELLS

COMPUTED BY: ______ DATE: 9-19-86

CHECKED BY: ______ DATE: ______

MW #	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11		J.A.	8.15	79.97	
3-1		J.A.	8.24	5.30	
3-2		J.A.	8.21	4.87	
3-3		J.A.	8.23	5.97	
3-4		J.A.	8.19	82.31	
3-5		J.A.	8.25	4.46	
7		J.A.	8.32	81.17	
10-1		—	—	—	
10-2		J.A.	8.05	5.67	
10-3		—	—	—	
10-4		J.A.	8.03	7.56	
GW-25		J.A.	8.08	84.64	
PIC-2		—	—	—	—
PIC-3		—	—	—	—
PIC-4		—	—	—	—
12-1		J.A.	8.40	79.66	
REI-12-2		J.A.	8.42	4.31	



REI

CALCULATIONS AND COMPUTATIONS

SHEET 1 OF 1

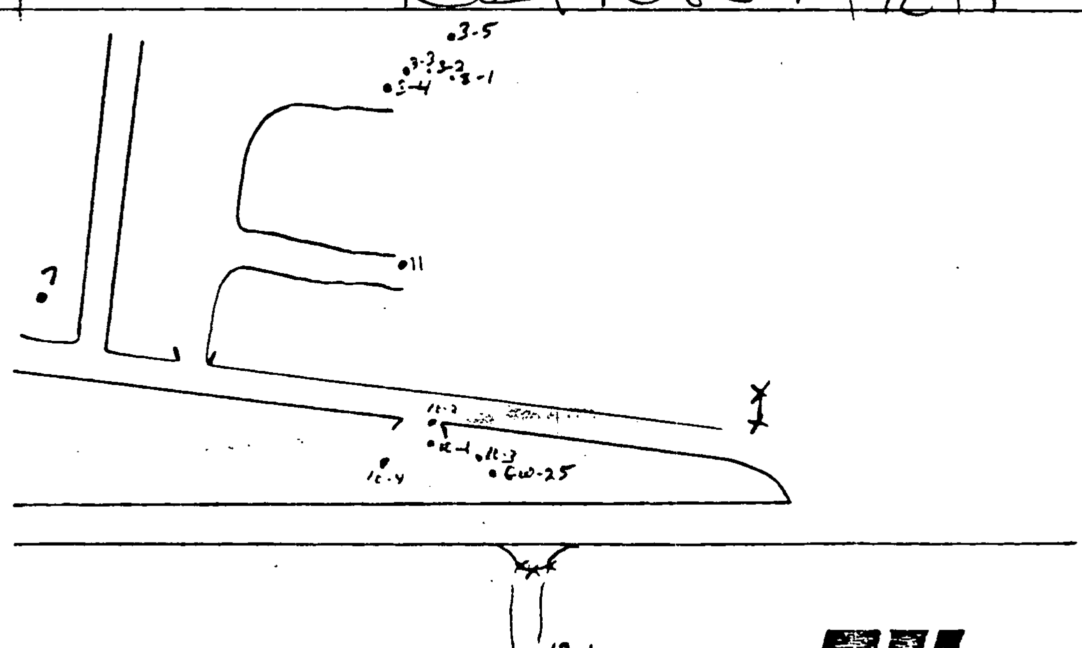
PROJECT: ____________________ JOB NO.: 275-14

SUBJECT: FRENCH LTD WELLS

COMPUTED BY: ______ DATE: 9/16/96

CHECKED BY: ______ DATE: ______

MW#	CASING ELEVATION FEET MSL	INITIALS	TIME	WL FROM NOTCH (FEET)	WL FEET MSL
11		CWA	0814	85.15	
3-1		CWA	0809	5.31	
3-2		CWA	0808	4.78	
3-3		CWA	0807	5.86	
3-4		CWA	0805	86.43	
3-5		CWA	0810	4.36	
7		CWA	0800	81.15	
10-1		SEE	INSITU		
10-2		CWA	0830	5.68	
10-3		CWA	0832	7.02	
10-4		CWA	0837	7.52	
GW-25		CWA	0833	92.85	
P10-2		—	—	—	—
P10-3		—	—	—	—
P10-4		—	—	—	—
12-1		CWA	0821	80.89	
12-2		CWA	08:23	4.2?	



REI